DEPARTMENT OF TRANSPORTATION

Effective Social Media Engagement Options for Minnesota's Diversifying Population

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16. Abstract (Limit: 250 words)

Minnesota Department of Transportation (MnDOT) and Minnesota Local Road Research Board (LRRB) supported the University of Minnesota to investigate social media options for effective public engagement. A three-part approach assessed 1) the state of social media use through a literature review, 2) the status of social media use and interest in its use for transportation in Minnesota compared to national data, and 3) actual and perceived effectiveness of social media in two pairs of case studies in Minnesota. In sum, results reveal social media is effective as a strategic and select part of engagement plans and can likely effectively engage select groups. Survey results revealed 11-21% of respondents participated in planning for transportation programs, policies or projects in the last 12 months, 72% use social media of some sort, and 36% expressed interest in using social media to get information, provide feedback or make suggestions related to transportation. Finally, social media analytics and interviews related to four case studies revealed social media does indeed lead transportation projects to make more connections with stakeholders, but the quality and effectiveness of those connections vary. Four main opportunities include: 1) integrating social media into multi-pronged, dynamic engagement approaches, 2) considering the demographic qualities of the key stakeholders to determine how social media can be most useful, 3) employing best practices for social media engagement, and 4) expanding and/ or developing research and evaluation plans to understand and assess future social media engagement efforts.

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Effective Social Media Engagement Options for Minnesota's Diversifying Population

FINAL REPORT

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EXECUTIVE SUMMARY

This study investigated 1) the status of social media use for public engagement in transportation planning and other related public sector areas across the United States, 2) the potential penetration rates of social media across and within diverse populations in Minnesota including diversity of location, race/ethnicity, socioeconomic status, and age, as well as 3) opportunities to maximize engagement with social media across diversity markers.

Methods

Multiple methods addressed the questions of interest: a literature review, telephone interviews, and case studies. The literature review assessed 1) published and technical reports focused on the use of internet-technology, emphasizing social media, for public engagement in transportation planning and other related public sector areas across the United States, as well as 2) use and penetration rates of social media across and within diverse populations differentiated by location, race/ethnicity, socio-economic status, and age.

Telephone interviews were conducted with questions informed by the literature review. Questions focused on use of social media generally as well as preferences for its use in public participation processes. Phone interviews from more than 800 Minnesotans, generally representative of the population, were analyzed to assess social media use, participation and interest in public planning processes and to compare use and interest across diversity markers.

Case study analysis provided insight and depth to the telephone interview data. Social media metrics and interviews with stakeholders of two paired transportation-planning cases examined actual social media engagement and stakeholders' perceptions of this engagement. Within each pair, cases had contrasting levels of social media as an engagement tool. Key social media analytics were collected from the platform and used analyzing sentiment, likes, retweets, shares, and numbers of comments. Thirty-nine qualitative interviews provided insight and depth on each respective case and the effectiveness of social media as an engagement tool.

Results

Results from each individual task are presented. A synthesis follows with opportunities to maximize social media as an engagement tool.

The literature review indicated social media needs to be part of a multipronged engagement plan because:

- Social media as an engagement tool may overcome societal forces that constrain marginalized communities from participating in the public planning process.
- While 90% of U.S. adults are online and 69% use social media, a social media-only plan may not reach people over the age of 65 or with a high school education.
- Information and crowdsourcing are frequently and seemingly effective uses of social media, but less is known and valued for social media for collaborative purposes.

Social media for engagement needs to be strategic:

- Platform use varies considerably: 79% of online adults use Facebook, 72% use video sharing (48% use YouTube), and African Americans and Latinos use video-sharing more than other groups.
- As of 2016, transportation organizations use Twitter at significantly higher rates than online adults leading to over coverage and perhaps lost opportunities to use Facebook and video-sharing more effectively.
- While 1 in 5 people rely on Internet access from their phones, phone-based outreach incurs data usage issues, which may eliminate some groups and simultaneously require design considerations for mobile-friendly/responsive presentations.

Results of telephone interview data analysis indicated:

- Contacting public officials and providing input via email were the most frequently used methods of participation in transportation program, policy, and project planning. Respondents with higher education and greater income participated more often in a variety of methods.
- 72% of respondents use social media. Facebook has the highest use overall and the highest daily use among Minnesota social media users, followed closely by YouTube (91.7% and 87.9%, respectively). Twitter was the only platform where use was not significantly different across diversity markers. Income, education, age, race and metro/non-metro residence significantly differentiated both overall social media and select platform use. As people age, social media use declined. Gender significantly differentiated social media use as well as Facebook and YouTube use.
- 36% of Minnesotan's interviewed expressed interest in using social media to get information, provide feedback, or make suggestions related to transportation programs, policy, and planning. When comparing interest levels, location, race, and age significantly differentiated preferences in social media use for providing feedback and making suggestions with metro residents, non-white residents, and residents younger than 65 generally being more interested. However, when predicting interest levels, demographic data did not predict interest or use, indicating all demographics were equally interested.

Social media analytics and interview results from the comparative case studies indicated:

- Transportation projects with higher social media use had more connections with users.
- Government social media primarily informed audiences, while community-created pages fostered deeper engagement and dialogue.
- Social media remains a supplemental tool for public engagement processes.
- Paying attention to a wide variety of social media metrics is key to understanding success of social media.
- Social media is cost-effective, nimble, and a good way to provide timely updates and draw people to other platforms.
- Unhappy stakeholders were often disappointed that they were stuck in the "inform" stage of the International Association for Public Participation's public participation spectrum.

Opportunities

These results suggest at least four main opportunities to strengthen meaningful social media engagement:

1) ***Integrate social media into multi-pronged, dynamic engagement approaches.*** As a tool for public engagement, social media has several appealing features including its ability to reach large audiences, its low cost, and its multi-media capabilities. However, it cannot stand alone or be used as a substitute for more traditional and collaborative public engagement methods. Additionally, social media is most effective when it is shared and dynamic:

    - ***Shared***. Pay attention and contribute to community-created social media pages to more effectively share information and leverage community relationships.

    - ***Dynamic***. Content and the timing of that content needs to stay fresh and interesting. Social media needs to provide a "regular diet" of new information and updates for people to stay engaged. Social media efforts with the greatest engagement also take advantage of its multi-media capacity.

2) ***Consider the demographic qualities of the key stakeholders to determine how social media can be most useful***. Literature, survey data, and social media analytics all indicate that certain demographic indicators significantly associate with interest in using social media as an engagement tool. Non-whites, metro residents, and those 30 – 49 years of age expressed higher interest in the use of social media for engaging in transportation planning among the Minnesotans surveyed. However, when the *cumulative* effect of surveyed Minnesotans' demographics indicators (gender, race, income, and education) were analyzed, predictive regression models suggest that interest in e-participation does not vary significantly based on one's position in society. Social media analytics from selected case studies indicated that age but not gender consistently predicts who engages in social media, with those aged 25 – 44 consistently highest.

3) **Employ best practices for social media management** such as:

    - Using hashtags to organize data can help stakeholders more easily understand and digest information in situations where many different projects may be ongoing simultaneously

    - Posting dynamic content when possible and appropriate, such as, videos, live streams, and encouraging dialogue and similar video postings by followers

    - Clearly stating social media guidelines for people who use platforms

    - Monitoring existing social media metrics readily available on each platform, such as Facebook Insights or Twitter Analytics.

4) Expand and/ or develop **research and evaluation plans** to understand and assess future social media engagement efforts. Reflect on what processes and strategies work well and why for different purposes, compare e-participation strategies to successful examples elsewhere and pay attention to the constantly shifting and evolving social media landscape.

CHAPTER 1: INTRODUCTION

Effective public engagement is a crucial component in transportation policy and project success. Since 2000, advances in technology and communications provide opportunities to engage with more people in new ways. Engaging the public through social media seems to make sense as the majority of most demographic groups report some social media use (Morris, Mueller, & Jones, 2014; Pew Research Center, 2016c; Pew Research Center, 2015a; Pew Research Center, 2011b). Social media sites are those that encourage interactivity by allowing users to share information with one another (Bregman & Watkins, 2014) rather than static webpages that simply share information. E-participation occurs when social media and other information communication technologies are used to facilitate public engagement through internet and technology (Evans-Cowley & Hollander, 2010). Although the majority of demographic groups use social media, some may still not be reached with only these tools (Pew Research Center, 2016c) and, as of 2017, social media cannot stand alone as an engagement process. While social media can be incorporated into outreach and engagement to optimize involvement in transportation planning, Minnesotans' use of social media platforms and preferences for social media use in transportation planning, policies and programs remain relatively unexplored.

To address this knowledge gap, the Minnesota Department of Transportation (MnDOT) and Minnesota Local Road Research Board (LRRB) funded the University of Minnesota to investigate social media options for effective public involvement. A multi-pronged project from 2016-2018 examined the state of knowledge on social media use and public engagement practices with social media and the status of Minnesotans engagement in transportation processes and their use of social media and compared select engagement measures on transportation projects with and without social media. This final report combines all three project tasks.

First, the literature review focused on assessing the state of knowledge on social media use. Specifically, it examined:

1) Published and technical reports focused on the use of Internet- technology, emphasizing social media, for public engagement in transportation planning and related public sector areas across the U.S. (Table C1).
2) Use and penetration rates of social media across and within diverse populations by location, race/ethnicity, socio-economic status, ability and age (Table C2).

Second, the telephone interviews addressed the status of Minnesotans use of social media and their preferences for social media use in transportation planning. Specific questions included:

1) How often do Minnesotans participate in planning for transportation programs, policies and projects and how does it vary across diversity markers?
2) How does Minnesotans' use of social media vary across diversity markers?
3) How interested are Minnesotans in using social media for select public involvement processes, and how does that interest vary across diversity markers?

Third, social media engagement data and qualitative interview data collected from four transportation case studies across urban and rural Minnesota compared two cases with and two cases without significant social media use. Specific questions included:

1) How do stakeholder attitudes of e-participation vary by project location and stakeholder characteristics?
2) Does social media use increase engagement? What do social media analytics indicate about whether and how?
3) Did differences between e-participation efforts across cases impact stakeholder perceptions of projects? How do stakeholders respond to social media? What are their perceptions of social media use, compared with other engagement methods?

This report will describe each individual task's data collection methods, present key results and a short discussion. These results are then discussed holistically, and the overall opportunities for social media engagement tools are presented.

CHAPTER 2: LITERATURE REVIEW

A literature review focused on assessing the state of knowledge on social media use among those in the United States. In sum, results reveal social media is effective as a strategic and select part of engagement plans, which can likely effectively engage select groups. Social media for engagement needs to be part of an engagement plan because:

1) While 90% of U.S. adults are online and 69% use social media, a social media-only plan may not reach people over the age of 65 or only with a high school education and
2) Information and crowdsourcing are frequently and seemingly effective uses of social media, but less is known about how social media is valued for collaborative purposes.

Social media for engagement needs to be strategic, for:

1) Platform use varies considerably: 79% of online adults use Facebook, 72% use video sharing (48% use YouTube) while African Americans and Latinos use video-sharing more than other groups;
2) As of 2016, transportation organizations use Twitter at significantly higher rates than online adults leading to over coverage and perhaps lost opportunities to use Facebook and video-sharing more effectively;
3) While 1 in 5 people rely on internet access from their phones, phone-based outreach incurs data usage issues and effective communications require mobile-friendly/responsive presentation.

2.1 METHODS

A variety of search terms and known scholars' names were included in the search, as well as ideas and support from the MnDOT library staff. Due to the evolving and dynamic nature of social media use, some of the high-yielding searches were filtered to exclude literature published prior to 2012, except for foundational documents or key baseline studies (A list of search terms and journals are provided in Appendix A.)

2.2 PUBLIC SECTOR USE OF SOCIAL MEDIA

The Open Government Initiative in 2009 required "federal agencies to take immediate, specific steps to achieve key milestones in transparency, participation, and collaboration" (About Open Government, 2015, para. 4). Since then, U.S. government social media use has become more pervasive as social media is one way to achieve these goals. Of the 116 articles reviewed, approximately 22 focused on transportation and 26 on internet and social media user demographics. Government social media uses ranged from local crowdsourcing to solicit solutions to widespread issues (Mergel & Desouza, 2013) to local governments hosting online town hall meetings (Mossberger, Wu & Crawford, 2013). Frequently mentioned reasons for social media use among government included agency representation in these online spaces, citizen engagement and networking, service improvement, and emergency response (Bregman & Watkins 2014; Graham, Avery & Park, 2015; Mergel, 2013).

As of 2011, the majority (96%) of "major federal agencies" (Government Accountability Office, 2011, p. 4) used social media in some way, shape, or form. In 2012, the majority (88%) of U.S. cities used social media, specifically Facebook (92%), Twitter (78%), and YouTube (59%; Oliveira & Welch, 2013). As of

2017, 85% of local governments used social media specifically to disseminate information to their constituents (Public Technology Institute, 2017).

- Facebook remains the most frequently used social media platform among local governments, followed by Twitter and YouTube (Graham et al., 2015; Oliveira & Welch, 2013; Public Technology Institute, 2017).
- Within the U.S. public sector, information dissemination is the most commonly reported use for social media (Bryer, 2013; Mergel, 2015; Oliveira & Welch, 2013; Zavattaro, French & Mohanty, 2015).
- Local government and federal agencies use social media to facilitate participation, such as the use of Twitter to obtain and respond to citizen budget suggestions (Mossberger, Wu & Crawford, 2013), or gather information (e.g. crowdsourcing, open-portals; Mergel & Desouza, 2013; Mergel, 2015; Mossberger, Wu & Crawford, 2013; Oliveira & Welch, 2013).

2.3 PUBLIC SECTOR TRANSPORTATION ORGANIZATION USE OF SOCIAL MEDIA

- Similar to federal and local governments, transportation agencies utilize social media for a variety of purposes (see Table C1).
- The majority of transportation agencies used social media by 2010 (Wojtowicz & Wallace, 2016). Social media usage among state DOTs has increased significantly since then, most notably among Facebook (approximately 50 percentage point increase) and Twitter (approximately 20 percentage point increase; American Association of State Highway and Transportation Officials (AASHTO), 2015). Longitudinal data on social media use in Minnesota transportation agencies are unavailable as of 2017.
- Social media use is referenced occasionally in literature on transportation planning (Bregman & Watkins, 2014; MaineDOT, 2015; Piatkowski & Afzalan, 2015). Citizen participation is sometimes facilitated through specifically designed software such as OpenPlans/Shareabouts, Urban Mediator or mySidewalk, which allows users to contribute input and ideas through discussion with transportation agencies and other citizens to potentially assist with planning projects (MaineDOT, 2015; Bregman & Watkins, 2014). One report suggests digital technology could be used for any purpose of public engagement, but its ability to quickly disseminate information to a wide audience makes it particularly well suited for informing and consulting (Urban Transportation Center, 2016).
- State level
    - In the U.S., close to 100% of state transportation agencies reported social media use (AASHTO, 2015).
    - The most frequently used social media platforms among state transportation agencies are Twitter (approximately 95%), followed by Facebook (approximately 90% use), and YouTube or Vimeo (approximately 80% use). These percentages hold since 2012 (AASHTO, 2015; Transportation Research Board (TRB), 2012).
    - The two most commonly reported uses of social media among regional and state transportation agencies across the United States are information dissemination (e.g. service alerts, fare increase information) and connection with constituents (TRB, 2012; Minooei, Sobin, Goodrum & Molenaar, 2015; Wojtowicz & Wallace, 2016).
    - In a survey of state transportation agencies, social media were considered least effective for reaching seniors and low-income communities (TRB, 2012).

    - Reported challenges of social media use among state transportation agencies include resource requirements such as trained staff availability (TRB, 2012; AASHTO, 2015), concerns about constituent criticism on social media (TRB, 2012), and the frequently changing social media landscape (AASHTO, 2015). Others warn of the possibility that social media could foster non-interactive one-way push interaction, as opposed to the dialogic engagement likely desired (Zavattaro & Sementelli, 2014). Additionally, existent policies do not always align well with government use of social media causing frustration among citizens and agencies. For instance, Jager, Bertot and Shilton (2012) discuss issues that can arise due to expectations created from agency use of social media. One such example is the discontinuity between the expectation of quick response on social media and social media use to solicit comments about proposed regulation; if the agency is unable to respond to questions during a notice and comment period, as bound by law, it may aggravate participants and lead to decreased future participation.
- City/county level
    - The most recent Minnesota data as of 2017 reports 52% of cities and 20% of counties used social media for transportation (MnDOT, 2011).
    - Among Minnesota cities and counties in 2011, social media was predominately used to disperse information only, though some did allow two-way communication through user postings (MnDOT, 2011).
    - Forty percent of Minnesota cities and counties used Facebook for transportation topics, with slightly less using Twitter and YouTube (36% and 12%, respectively; MnDOT, 2011).

2.4 OVERVIEW OF PARTICIPATION FRAMEWORKS

Analytical frameworks used to understand and organize public participation experiences include Arnstein's (1969) Ladder of Public Participation and the International Association for Public Participation (IAP2) Spectrum of Public Participation. These frameworks characterize participation experiences based on the extent of power they afford citizens. Arnstein's Ladder describes eight different participation scenarios, which can be broadly categorized into nonparticipation, tokenism, and citizen power. Similarly, the IAP2 spectrum's five stages range from informing to empowering, with each stage promising progressively more power to citizens involved in the participation process.

However, as evaluation of social media engagement and e-participation processes has become more commonplace, specific frameworks designed for these information communication technology experiences have emerged. The Social Media Participation Range was developed to help researchers and practitioners think about and describe the types and qualities of e-participation experiences (Figure 2.1). This framework is comparable to both Arnstein's Ladder and the IAP2 spectrum in that it characters participation along a range; in this case, the framework characterizes legitimacy in citizen engagement through social media as defined by signal bars that start at non-adoption and are full when the participation process has legitimacy in the eyes of the public. With each additional signal bar, barriers are broken down and access to information improves, paving the way for superior government for citizens (Toscano, 2017).

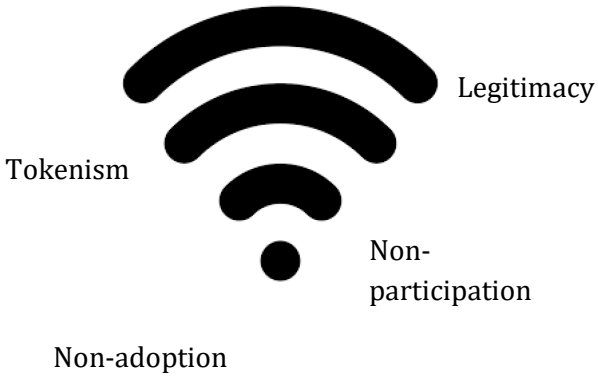


Figure 2.1. Social Media Participation Range (Adapted from Toscano, 2017)

2.5 OVERVIEW OF INTERNET USE AMONG THOSE IN THE UNITED STATES

To understand social media use, understanding overall internet use is pertinent, as is internet use by select diversity markers of interest to this project. Key findings are presented below:

- Nearly nine of 10 U.S. residents over 18 use the internet (87%; Pew Research Center, 2016a). Similarly, among Minnesotans 8 in 10 use the internet (83%; NTIA, 2015).
- This majority use holds among U.S. residents in age groups through age 75, all income levels, all education levels, African-Americans, Latinos, English-speaking Asian-Americans, people with disabilities, residential location as well as gender (Pew Research Center, 2015c; Pew Research Center, 2016a).
- Though still a majority, those with the lowest percentage of internet use includes those with a disability (54%; NTIA, 2015), those with an annual household income of less than $30K (approximately 76%), and those over 65 years of age (approximately 60%; Pew Research Center, 2015c; Pew Research Center, 2016a).

Internet use across markers of diversity

- Internet use increases with income and educational attainment but decreases with age (Pew Research Center, 2015c; Pew Research Center, 2016a).

- Internet use is similar across races (Pew Research Center, 2015c; Pew Research Center, 2016a) with the majority using it; English-speaking Asian-Americans have the highest percentage of use (97% compared to slightly more than 80% on average for whites, blacks, and Latinos; Pew Research Center, 2016a).
- Internet use is lower for U.S. residents with a reported disability than those without (54% compared to 81% general population; Pew Research Center, 2011a).
- Within specific demographic groups, demographic variables interact and influence use similar to the general population. For example, internet use decreases as income and education level does among African-American and senior citizens (Pew Research Center, 2014a; Pew Research Center, 2014b).
- Approximately one in five of those in the U.S. rely on their smartphone for internet access due to lack of broadband at home or few options for online access other than their smartphone. Seven percent of U.S. residents are “smartphone dependent”, i.e. they own a smartphone, but

do not have broadband at home and do not have easily available alternatives for internet (Pew Research Center, 2015f). As on 2016, just over one in ten American adults own a smartphone, but do not have at home broadband (Pew Research Center, 2017b)

2.6 OVERVIEW OF SOCIAL MEDIA USE OF THOSE IN THE UNITED STATES

The potential effectiveness of social media use for public engagement is largely dependent on the penetration rate across target audiences. To understand these opportunities, general information is provided on overall social media use as well as specific platforms (Twitter, Facebook, etc.).

- Seven of 10 U.S. adults use some form of social media (69%; Pew Research Center, 2017a). Comparably, 7 in 10 Minnesotans have reported social media use (71%; National Telecommunications and Information Administration, 2015).
- This majority of social media use holds across age groups to age 65, all income levels, all education levels, Whites, African-Americans, Latinos, Asian-Americans, residential location, gender and those with disabilities (Morris et al., 2014; Pew Research Center, 2017a; Pew Research Center, 2011b).
- Those with the lowest use of social media are people over 65 and those with a high school diploma or less education (34% and 59%; Pew Research Center, 2017a).

Social media use across markers of diversity (see Table C2)

- Social media use increases with income and education and decreases with age (Pew Research Center, 2017a).
- In available reports, fewer but still a majority of African-Americans reported using social media than Latinos and Asian-Americans (63%, 74% and 65%, respectively; Pew Research Center, 2017a; Pew Research Center, 2011b). Furthermore, as with internet use, social media use decreases with lower income and education among African-Americans (Pew Research Center, 2014a).

Specific social media platform use

- Use of social media platforms varies considerably by demographic group.
    - Among all U.S. adults over 18, more than half use Facebook and video-sharing sites (68%; Pew Research Center, 2016c; 72%; Pew Research Center, 2013b). Slightly less than half use YouTube specifically (48%; Pew Research Center, 2016b). Approximately a quarter use Twitter, Instagram and/or Pinterest (Pew Research Center, 2016c). Relative newcomers to the scene, Snapchat, Reddit, Tumblr, and Vine use is increasing. Snapchat use is estimated at between 10% (Pew Research Center, 2016b) and 14% of U.S. adults (eMarketer, 2016a). Reddit, Tumblr and Vine use is reported by less than one in twenty U.S. adults over 18 (Pew Research Center, 2016b).
    - When considering online U.S. adults over 18, usage rates are only slightly higher for Twitter, Instagram and Pinterest (3% increase for Twitter, 4% for Instagram, and 5% for Pinterest; Pew Research Center, 2016c). Facebook use increases substantially for online users (11% increase; Pew Research Center, 2016c). The Snapchat use estimate for 2015 increases 10% among smartphone users (estimated 24% use; eMarketer, 2016a).
    - Among specific social media site users, those who use Facebook have the greatest frequency of use with more than three in four using daily and about one in five using

weekly or less often (76%, 15%, and 7%; Pew Research Center, 2016c). Instagram and Twitter users have much lower frequency of use, with about half using daily (51% and 42%; Pew Research Center, 2016c). Around a quarter of users check Instagram each weekly or less often. About a quarter check Twitter weekly and one in three check it less than weekly (Pew Research Center, 2016c).

- Facebook is the most frequently used platform (Pew Research Center, 2016c). Its growth has slowed since 2013, but the level of user engagement with the platform has continued to increase (Pew Research Center, 2016c). The fact that Facebook is the most frequently used platform holds true across gender, age, residential location, education, racial and ethnic group (among White, African-Americans, and Latinos), and income groups. Those least likely to use Facebook are adults over 65 (62%; Pew Research Center, 2016c), but a majority of this age group still use it.
- Video-sharing site use increases with educational attainment and income but decreases with age (Pew Research Center, 2013b). Percent use is high among African-Americans and Latinos (76% and 74%; Pew Research Center, 2014e).
- Twitter use is similar across African-Americans, Latinos, gender, location and income levels (about 25%; Pew Research Center, 2015e; Pew Research Center, 2016c). Twitter use does increase with education level and decrease with age (Pew Research Center, 2016c).
- Instagram use is similar across education, and income (about 35%; Pew Research Center, 2016c). Percent use is relatively high among black people and Latinos (38% and 34%; Pew Research Center, 2015e); use decreases with age, and is especially low among men, suburban and rural area residents (26%, 28%, and 31%; Pew Research Center, 2016c).
- Pinterest use substantially varies across demographics, with the exception of income. Regardless of income, about 32% use Pinterest (Pew Research Center, 2016c). Use increases with education level but decreases with age. Use is markedly high in women and among suburban residents (45% and 34%; Pew Research Center, 2016c) but lower among rural residents, men, African-Americans, and Latinos (25%, 17%, 12%, and 21% respectively; Pew Research Center, 2016c; Pew Research Center, 2015e).
- Snapchat use is estimated to be similar across genders (54% of users are female, 46% male; eMarketer 2016b). Similar to other platforms, use decreases with age (eMarketer, 2016c).

2.7 OVERVIEW OF MULTIPLE HIERARCHY STRATIFICATION

Beyond looking at demographic characteristics individually, the opportunity and theory exist to consider them simultaneously. Social stratification organizes individuals in society into a hierarchy of distinct strata based on their power, privilege, and prestige. Multiple Hierarchy Stratification (MHS) posits that one's position in society is best understood by examining the combined effect of key demographic characteristics (age, race, gender, and socio-economic status). According to MHS, multiple demographic-based layers of inequality reinforce each other, such as being black and female, and multiple advantages compound, such as when one is both rich and white (Jeffries & Ranford, 1980; Yinger, 1993). It is expected that those who occupy the highest stratum, characterized by being white, male, wealthy, well educated, and middle-aged, have the most access to society's resources. Individuals within progressively lower strata are expected to have progressively less access to society's resources (Jeffries & Ranford, 1980). In sum, social science literature indicates that demographic variables combine to impact every aspect of one's life (Feagin, 2014), with potential implications for social media engagement.

CHAPTER 3: TELEPHONE INTERVIEWS

Telephone interviews were conducted with Minnesota residents fall through spring, 2016-2017 as part of the annual Minnesota State Survey (MSS) of Minnesota adults age 18 and over.

In sum, results from interviews among a representative sample of 820 Minnesotans revealed:

1) 11-21% participated in some way for planning transportation programs, policies and projects in the last 12 months. Contacting public officials and providing input via email were the most frequently used forms of participation (20.7% and 19%, respectively; Table D2). Education and income significantly differentiated transportation planning participation: those with at least some college participated via focus group or survey, community meetings, email and contacting a public official more than those with less education; those with annual incomes over $70,000 participated in community meetings and via email more than those with incomes between $30,000 and $49,900.
2) 72% of respondents use social media. Income and education significantly differentiated overall social media use where income and education generally led to greater social media use. Facebook has the highest use overall and highest daily use among Minnesota social media users, followed closely by YouTube (91.7% and 87.9% respectively). Twitter was the only platform where use was not significantly different across diversity markers. Age, race and metro/non-metro residence significantly differentiated both overall social media and select platform use. Generally as people age, social media use declined. Age and education significantly differentiated Instagram and Snapchat use. Age also significantly differentiated YouTube use. Non-Whites used social media, and specifically YouTube, more than Whites. Location (rural vs metro) differentiated Pinterest use. Gender significantly differentiated social media use as well as Facebook and YouTube use.
3) 36% of Minnesotan's interviewed expressed interest in using social media to get information, provide feedback or make suggestions related to transportation programs, policy and planning. Location, race, and age significantly differentiated preferences in social media use for providing feedback and making suggestions: those in the metro area and non-White were more interested than greater Minnesota residents and Whites; those aged 30-49 were more interested than those 65 and older. Location and race also significantly differentiated preferences for receiving information via social media: metro area respondents were more interested than greater Minnesota respondents and non-Whites were more interested than Whites.

3.1 METHODS

3.1.1 Sampling

The MSS used a dual sampling frame dialing both landline and cell phone users with random digit samples acquired from Survey Sampling International. On the landlines, both a household telephone number and a person within the household were selected by identifying the adult person with the most recent birthday. Selection method guaranteed that every landline household in the state had an equal chance of inclusion and, that once the household was selected; every adult had an equal chance for inclusion. The cell phone survey samples included cell phone numbers assigned to Minnesota area codes. The MSS screened out both numbers and individuals based on: cell phones classified as inactive/unassigned if not used in the past 10 months, people under 18 years of age, those whose main residence was outside of Minnesota, and, for the cell phone sample, those with a working landline

telephone in their home. Oversampling continued through April 2017 to secure additional non-White respondents for comparative purposes. A total of 820 interviews were completed: 426 landline interviews (57% of sample) and 350 cell phone interviews (43% of sample). The response rates were 14% and 9% for landline and cell phone samples, respectively. The cooperation rates were 28% and 20%, respectively (Armson, 2017). As telephone surveys tend to oversample those living in single-individual households, these individuals were down weighted and others were up weighted. Specifically, the landline interview results were weighted by the number of adults living in the household. Single-individual households were down weighted by about 50% and others up weighted accordingly to more accurately represent Minnesota adult distribution within households. Cell phone cases were not weighted (Armson, 2017).

As the Center for Survey Research (CSR) randomly selected all participants from Minnesota's population, the survey results are generalizable to the entire state. With the sample size of 820 and sampling procedures followed, the chance of answers varying by more than 3.5 percentage points from the response if all Minnesotans had been interviewed is one-in-twenty (Armson, 2017).

3.1.2 Interview Questions

Based on previous research and expert review, questions were developed and then reviewed and edited by the Technical Advisory Panel as well as CSR staff. Questions focused on 1) respondents' participation in public planning generally in the last 12 months as well as participation in transportation planning activities, 2) respondent use of social media generally and their frequency of specific platform use (Facebook, YouTube, etc.) and 3) respondent interest in social media use in transportation planning and/or projects. Demographic questions included age, income, education, gender, disability status, and race. In addition, respondents identified their location in either greater Minnesota area or the seven-county metro area (Anoka, Carver Dakota, Hennepin, Ramsey, Scott, and Washington counties; Appendix B).

Both general and specific public participation questions were asked. General participation in public planning in the last 12 months was determined with a simple "yes" or "no" response. Then, participation in six forms of public participation in transportation program, planning or policies in the last 12 months was assessed with a 'yes' or 'no' response option. The six forms of participation included: 1) attending a community meeting or hearing, 2) completing a survey or being in a focus group, 3) using social media, 4) providing input via email 5) contacting a public official, or 6) doing something else (Transportation Research Board, 2011; Pew Research Center, 2010).

General social media use and specific social media platform use were assessed. General social media use was asked with a simple 'yes' or 'no' (Pew Research Center, 2010). Then, frequency of using six social media platforms was measured along six levels: daily, every other day, weekly, monthly, less often than that, or never (Pew Research Center, 2015a). The six specific platforms assessed included: Twitter, Instagram, Pinterest, Facebook, Snapchat, and YouTube (Pew Research Center, 2015a). Respondents had the option to answer 'don't know' to any of these questions as well as provide the name of any other platform they used.

Finally, respondent interest in receiving information, providing feedback, or making suggestions on transportation planning, projects or programs through social media was assessed. Respondents expressed their interest in these select uses of social media along a four-point scale ranging from "not at all interested" to "very interested" (Transportation Research Board, 2012; Mergel, 2013; Schweitzer, 2014; Piatkowski & Afzalan, 2015).

CSR demographic data included age, income, gender, education, and race/ethnicity. Respondent county residence and disability status were also identified. Age was assessed with an open-ended question: "what year were you born." For income, respondents indicated whether their household income was above or below $70,000, after which the interviewer listed $10,000 increments from under $10,000 to $70,000 or $70,000 to over $130,000 and requested the respondent indicate to which category they belong. "Don't know" and "refused" were also options. When income response could be included in two categories, exactly $50,000 for example, it was included in the higher category ($50,000 to 60,000). With regard to gender, respondents were asked whether they were male or female. Education level and race were open-ended questions: "what is the highest level of school you have completed", and "what race do you consider yourself." Respondent county residence was identified through zip-code attribution. Respondents self-reported a disability in the employment-related questions (Appendix B).

3.1.3 Data Analysis

Data analysis was conducted with Statistical Package for the Social Sciences (SPSS) version 24. Prior to descriptive and comparative analysis, data were checked for accuracy, variance and sample sizes. After determining data suitability, descriptive analysis of frequencies, means, medians and standard deviations was prepared on variables of interest. Based on expert sources (A. Rendahl, personal communication, June 2017; Johnson, 2008), analysis used both unweighted and weighted data: comparative analysis used unweighted and descriptive analysis used weighted data. For comparative purposes, categorical groupings for age, education, and income were created to align with studies on social media use by Pew Research Center (2015a). Specifically, age was categorized into four groups: 18-29, 30-49, 50-64, and 65 years and over. Education was grouped into three groups: high school graduate or less, some college, or at least a college degree. Annual income categories consisted of four groups: less than $30,000, $30,000-49,900, $50,000-69,900, and $70,000 or more. Following past research (Pew Research Center, 2016c) and consultation with MnDOT, frequency of social media platform use was grouped into three categories for comparative analysis: daily or every other day, weekly, monthly or less often. Comparative and descriptive analysis omitted responses such as "don't know" or "refused."

To detect similarities and differences among groups where sample sizes were large enough, statistical tests were conducted and included: chi-square tests, Kruskal-Wallis H-tests, and Mann-Whitney U-tests. When more than two groups were compared, statistical differences were assessed with Bonferroni corrections for multiple comparisons.

To understand whether public interest in social media as an engagement tool aligned with the theory of multiple hierarchy stratification, binomial regression models were used to predict to what extent the typical occupant of each demographic strata would be interested in receiving information, providing feedback, and making suggestions through social media.

3.2 RESULTS

3.2.1 Sample

The majority of respondents were White, reported at least some college education, and annual income greater than $50,000 (Table D1). Respondents were fairly equally split in residence between the seven-county metro area or greater Minnesota (54% and 46%, respectively). In terms of gender, respondents were evenly distributed (51% female/49% male). Similarly, respondents rather equally represented age groups from 30 to over 65 (approximately 30% in each group). The sample had the fewest respondents

aged 18-29 (11.8%; Table D1). Overall, the sample was representative of Minnesota residents with the exception of age where the sample had fewer respondents aged 18-29 than the Minnesota population and more respondents 65 and over. Additional sample information is provided in Appendix C.

3.2.2 Participation in general and transportation planning among Minnesotans

Approximately a quarter of respondents participated in any type of public planning and/or projects in the past twelve months (22.1%; Table D2). Participation in transportation-specific programs, projects or planning ranged from 10.6% to 20.7% (Figure 3.1, Table D2). Most frequently, Minnesotans participated in transportation-specific programs, projects or planning by contacting a public official and least frequently by participating in way other than those listed (20.7% and 10.6%, respectively).

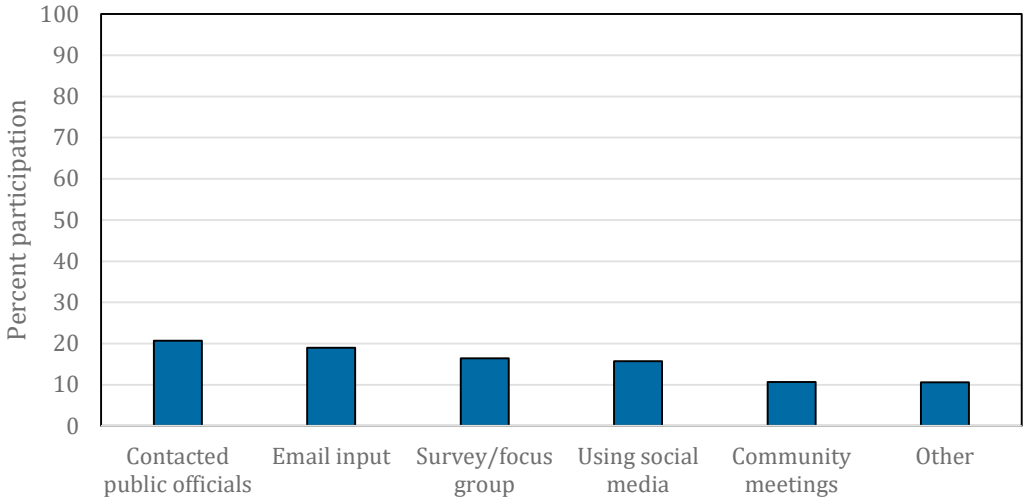


Figure 3.1. Percent participation in transportation project, program and planning processes among Minnesota State Survey 2016 respondents (n=814-819)

Likelihood of participating in four of the participation forms presented differed significantly by education level while two differed by income. Specifically, education level differentiated participation by use of public official contacts, email, surveys/focus groups, and community meetings; income differentiated email and community meeting participation (Figures 3.2 and 3.3, Table D2).

- *Education differentiated 4 of 6 involvement methods:* Respondents with some college or at least a college degree contacted public officials, provided input via email, and participated in focus groups/surveys more than those with a high school diploma or less (22%, 23.7%, 9.9%, $\chi^2(2)= 13.22$, $p=.001$; 21%, 21.3%, 8.7%, $\chi^2(2)= 11.58$, $p=.003$; 18.9%, 18.2%, 7.3%, $\chi^2(2)= 11.18$, $p=.004$). Respondents with at least a college degree participated in community meetings significantly more than those with a high school diploma or less (12.8% and 4.6%, respectively, $\chi^2 (2) = 9.11$, $p= .011$; Figure 3.2, Table D2).

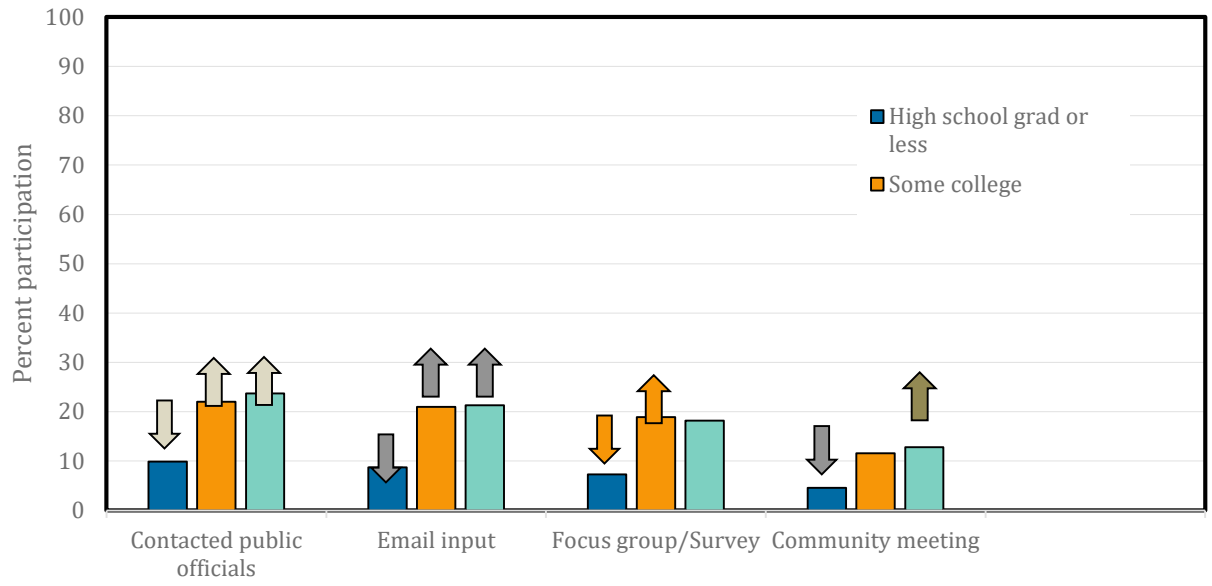


Figure 3.2. Percent transportation planning participation by education level among Minnesota State Survey 2016 respondents (n=805-812)

Note: up arrows indicate groups with statistically higher participation, down arrows indicate those with statistically lower participation Color differences indicate groups between which differences exist.

- *Income differentiated 2 of 6 involvement methods:* Respondents with incomes over $70,000 reported providing input via email or participating in a community meeting significantly more than those with incomes between $30,000 and $49,900 (22.9% and 11.4%, $\chi^2(3)= 9.92$, p=.019; 14.5% and 4.1%, $\chi^2(3)= 13.25$, p=.004; Figure 3.3, Table D2).

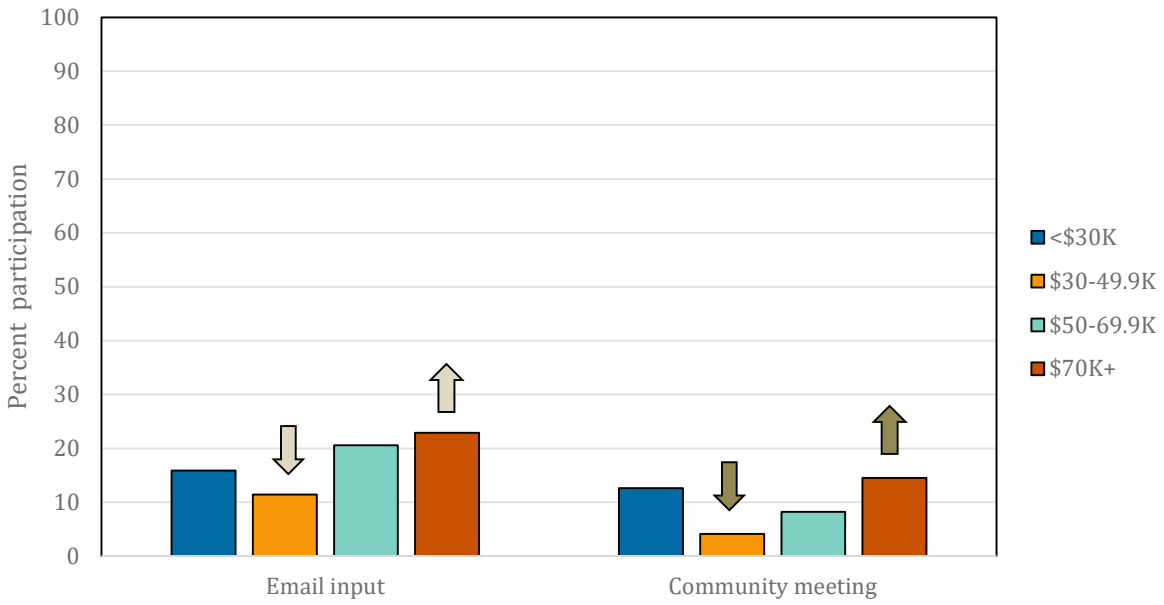


Figure 3.3. Percent transportation participation by income group among Minnesota State Survey 2016 respondents (n=692-702)

3.2.3 Social media use among Minnesotans

Results revealed 71.5% of Minnesotans use social media. Similar to nationwide data (Pew Research Center, 2017a), which shows that 69% of those in the United States use social media, social media use increased with education and income levels but decreased with age. Significant differences in social media use emerged when comparing use by age, income, education, race, gender, and location.

Specifically,

- *Age:* Respondents aged 18-29 and 30-49 reported significantly higher use than those 50-64 or those 65+ (95.7%, 88.4%, 72.4% and 46.3%, respectively, χ^2 (3) = 138.72, p< .001; Figure 5, Table D2). Additionally, those aged 50-64 had significantly higher use than those over 65 (72.4% and 46.3%, Figure 3.4, Table D2).

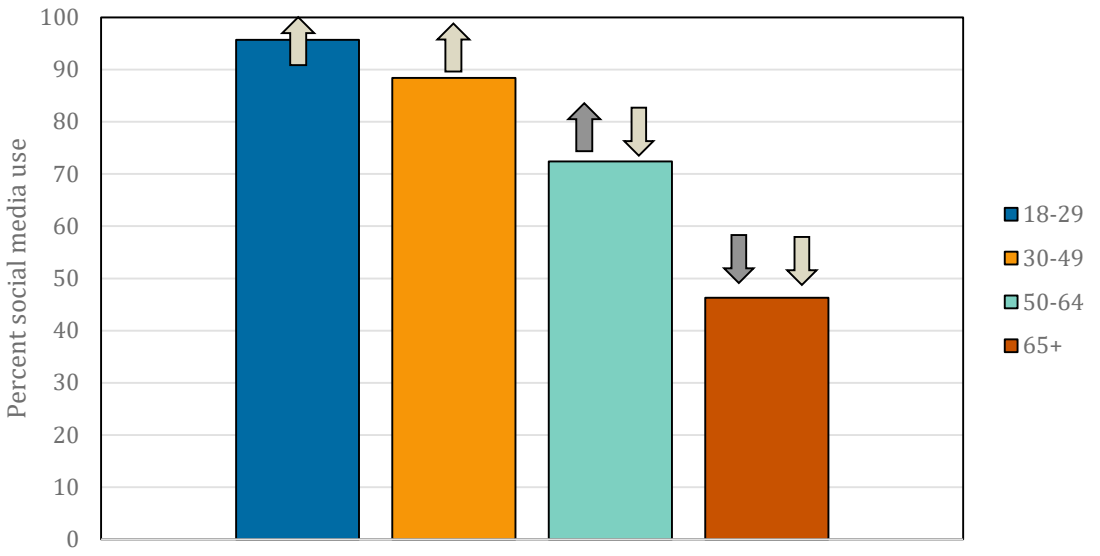


Figure 3.4. Percent of social media use by age groups among Minnesota State Survey 2016 respondents (n=778)

Note: Up arrows, indicate groups with statistically higher use, down arrows indicate those with statistically lower use. Color differences indicate groups between which differences exist.

- *Income:* Those with annual household incomes of $70,000 or greater reported significantly higher social media use than those with annual household incomes of $30,000-$49,900 or $30,000 or less (77.6%, 65%, and 65.4%, respectively, χ^2 (3) =, 18.8, p< .001; Figure 3.5, Table D3).

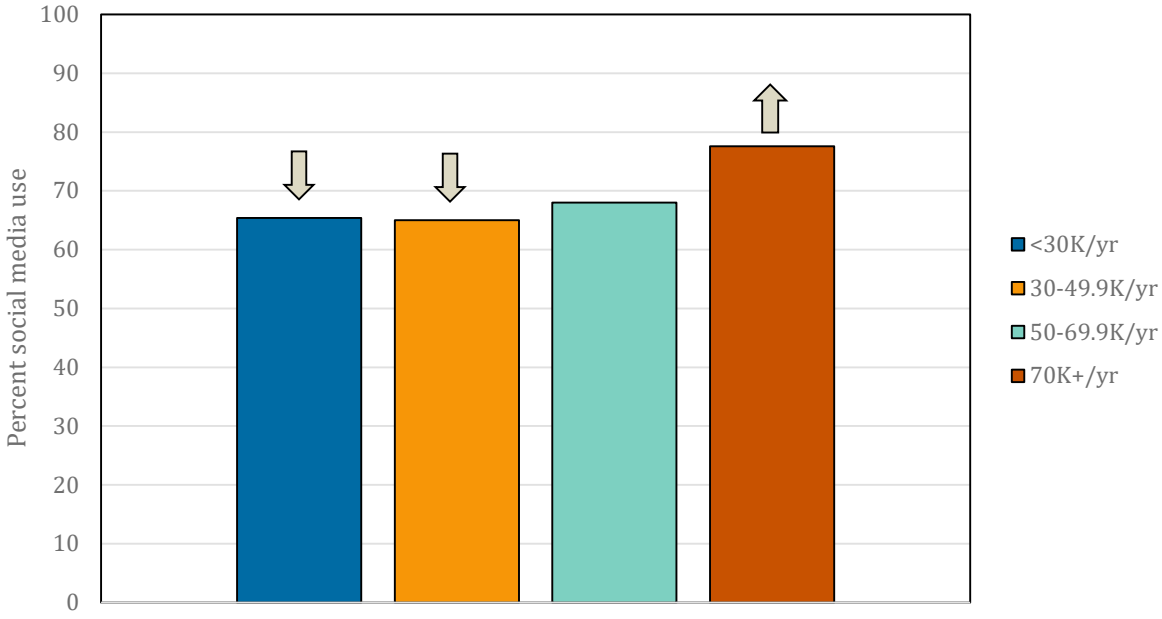


Figure 3.5. Percent of social media use by income levels among Minnesota State Survey 2016 respondents (n=697)

Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use.

- *Education:* Respondents with some college or at least a college degree reported significantly higher social media use than those with a high school education or less (76.8%, 73.4% and 56.3%, respectively, χ^2 (2) = 27.43, *p*< .01; Figure 3.6, Table D3).

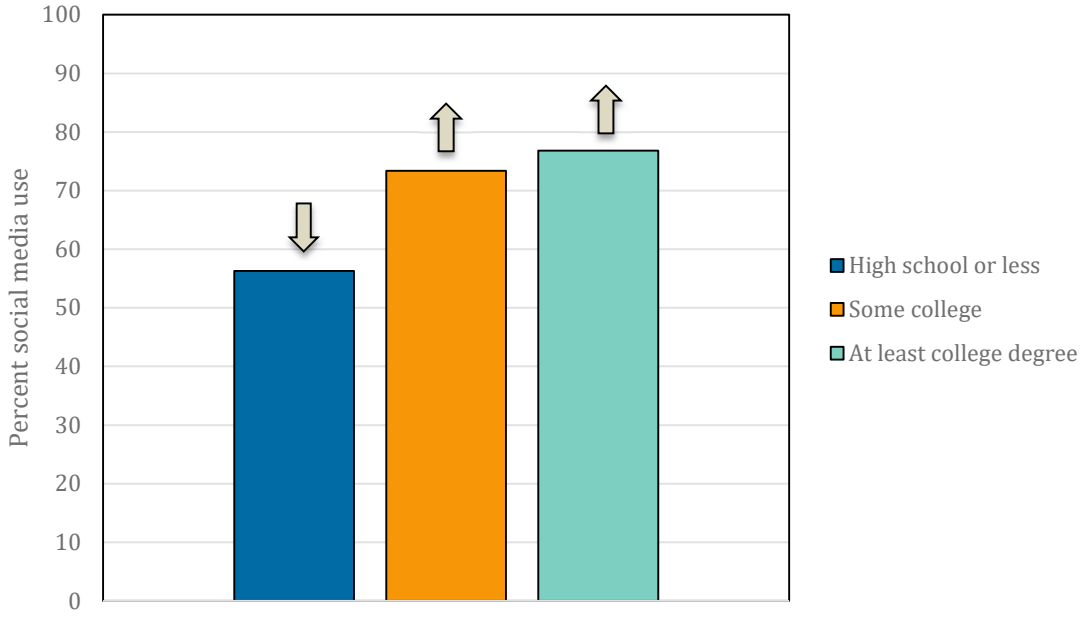


Figure 3.6. Percent of social media use by education level among Minnesota State Survey 2016 respondents (n=810)

Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use.

- *Race:* Non-Whites reported significantly higher social media use than Whites (83.6% and 69.6%, respectively, χ^2 (1) = 8.96, *p*= .003; Figure 3.7, Table D3).

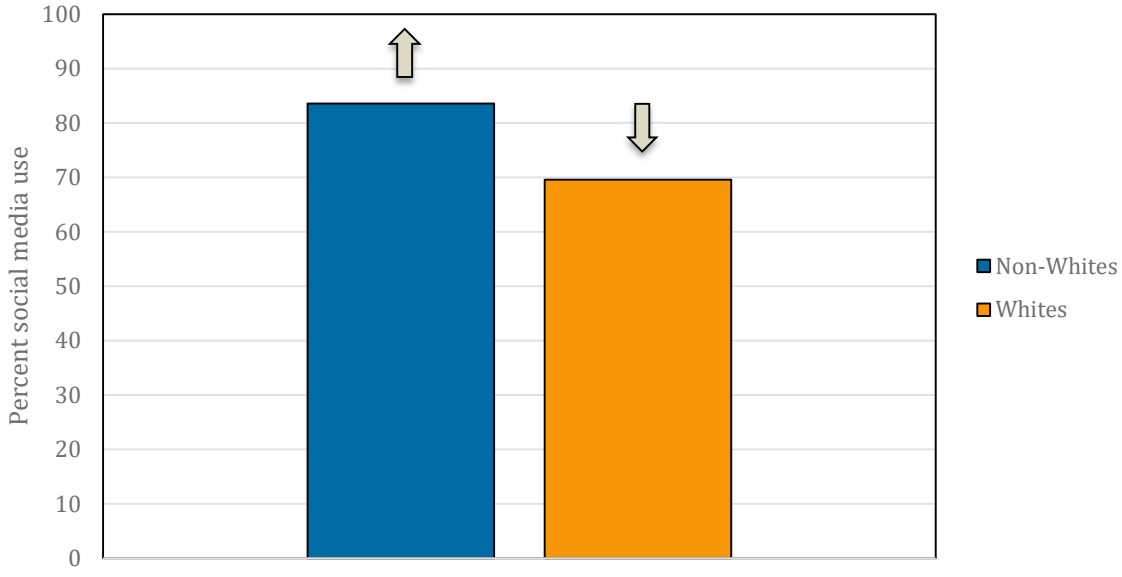


Figure 3.7. Percent of social media use by White and non-Whites among Minnesota State Survey 2016 respondents (n=797)

Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use.

- *Gender:* Females reported significantly higher social media use than males (76.1% and 66.7%, respectively, χ^2 (1) = 5.03, *p*= .025; Figure 3.8, Table D3).

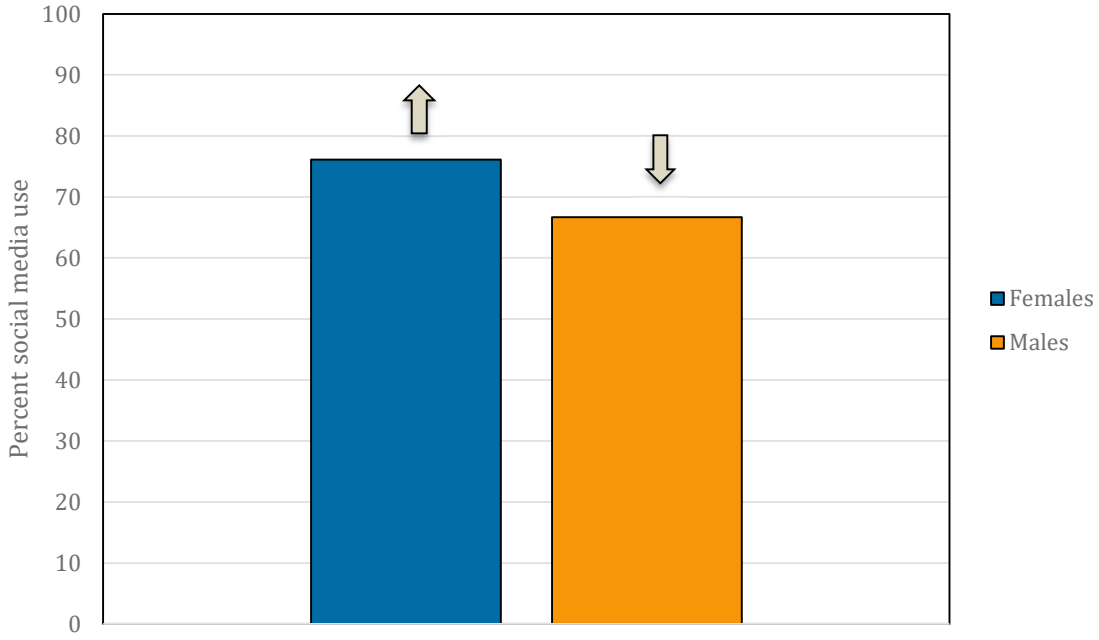


Figure 3.8. Percent of social media use by gender among Minnesota State Survey 2016 respondents (n=820)
Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use.

- *Location:* Metro area residents reported significantly higher social media use than those in greater Minnesota (77.1% and 64.9%, respectively, χ^2 (1) = 17.59, *p*< .01; Figure 3.9, Table D3).

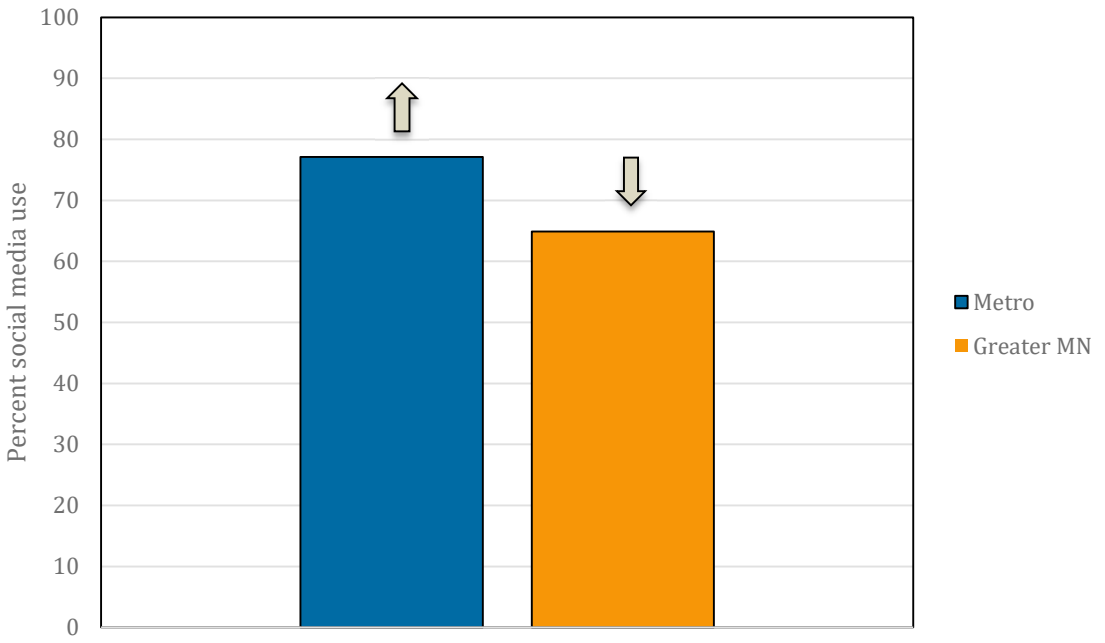


Figure 3.9. Percent of social media use by location among Minnesota State Survey 2016 respondents (n=820)
Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use.

Facebook is used most frequently both overall and daily among Minnesota's social media users (91.7% use), although YouTube is a close second (87.9% use; Figure 3.10, Table D4). Income level did not differentiate platform use, but each of the other diversity markers did. Twitter use was the only platform where use did not significantly differ across any diversity markers.

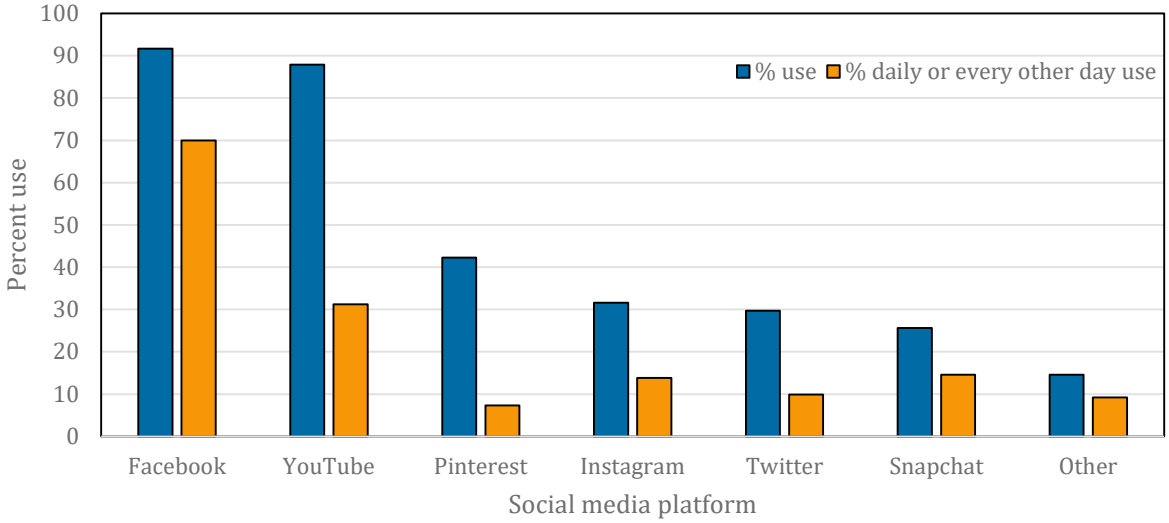


Figure 3.10. Percent overall platform use and daily or every other day platform use among Minnesota State Survey 2016 social media users (n=576-585)

Specifically,

- *Race/ethnicity differentiated 2 of 6 platform daily/every other day use:* Non-Whites reported significantly more daily/every other day use of YouTube and social media sites other than those listed than Whites (U = 12,461, $p < .01$; and U = 451.5, $p = 026$; Figure 3.11, Tables D5 and D10).

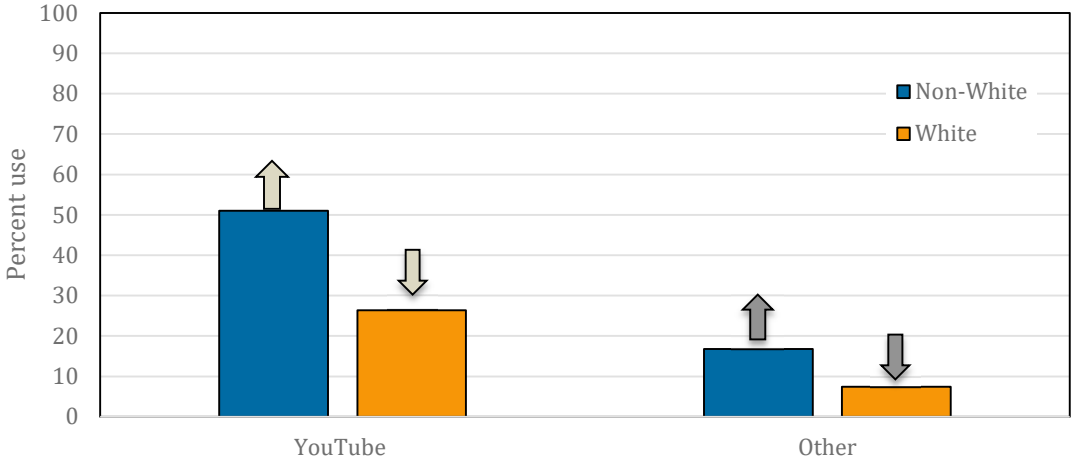


Figure 3.11. Percent of daily/every other day YouTube use by race among Minnesota State Survey 2016 social media users (n=562-571)

Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use. Color differences indicate groups between which differences exist.

- *Location differentiated 2 of 6 platforms:* Greater-Minnesota residents reported significantly higher daily/every other day use of Pinterest and other social media sites not listed than metro area residents (U = 8,184.5, p=0.023; and U = 1,092, p=0.018; Figure 3.12, Tables D5 and D10).

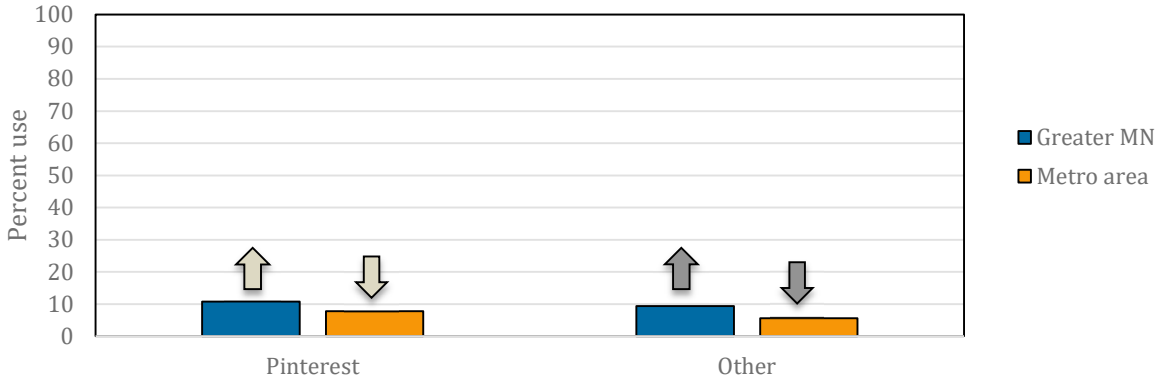


Figure 3.12. Percent of daily/every other day Pinterest and other social media platform use by location among Minnesota State Survey 2016 social media users (n=575-582)

Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use. Color differences indicate groups between which differences exist.

- *Age differentiated 3 of 6 platforms:* 18-29 year olds reported higher YouTube, Instagram and Snapchat use than other age groups at statistically significant levels. For YouTube, use was higher among those aged 18-29 than those 30-49, 50-64, or 65+ (H= -74.17, $p < .01$; H= -124.29, $p < .01$; H= 110.48, $p < .01$; Figure 3.13, Tables D5 and D11). Additionally, 30-49 year olds reported higher YouTube use than those 50-64 (H= -50.13, $p= .006$; Figure 3.13, Tables D5 and D11). For Instagram, those aged 18-29 reported significantly higher use than those 30-49, 50-64, and 65+ (H= -35.05, $p <.001$; H= -28.81, $p =.044$; H= 38.66, $p =.018$; Figure 3.13, Tables D5 and D11). Those 18-29 also reported significantly higher use of Snapchat than those 30-49, 50-64, and 65+ (H= -27.99, $p <.001$; H= -42.49, $p <.001$; H= 42.04, $p =.017$; Figure 3.13, Tables D5 and D11).

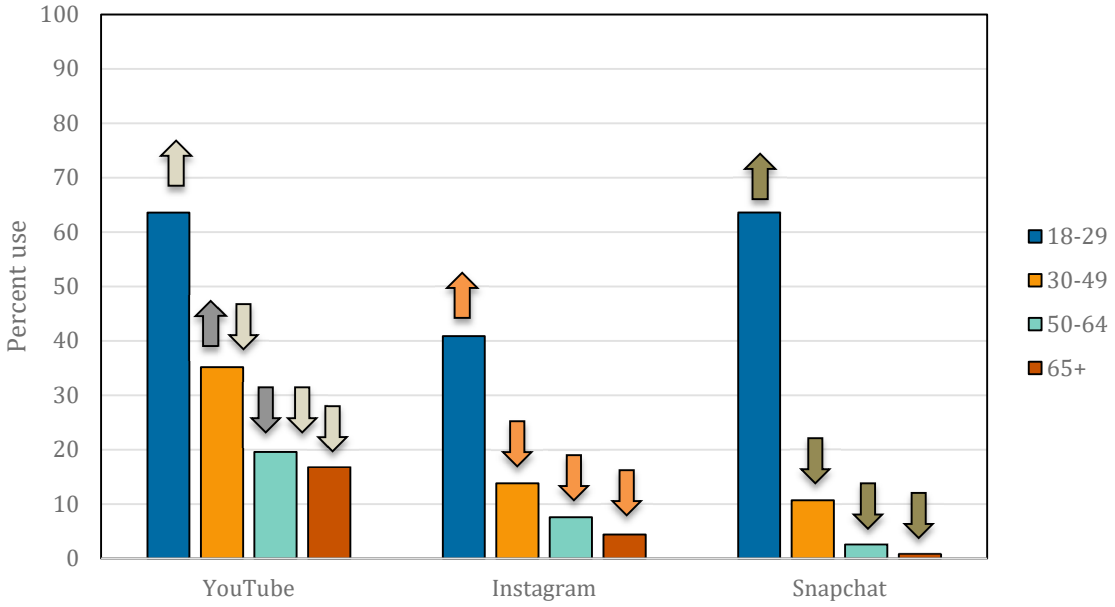


Figure 3.13. Percent of daily/every other day YouTube, Instagram, and Snapchat use by age among Minnesota State Survey 2016 social media users (n=555-556)

Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use. Color differences indicate groups between which differences exist.

- *Education differentiated 2 of 6 platforms:* Respondents with a high school education or less reported significantly higher Instagram use than those with some college or at least a college degree (H= -28.66, $p= .049$; H= -27.21, $p= .05$; Figure 3.14, Tables D5 and D11). Respondents with a high school education or less also reported significantly higher Snapchat use than those with some college education (H= -21.46, $p= .03$; Figure 3.14, Tables D5 and D11).

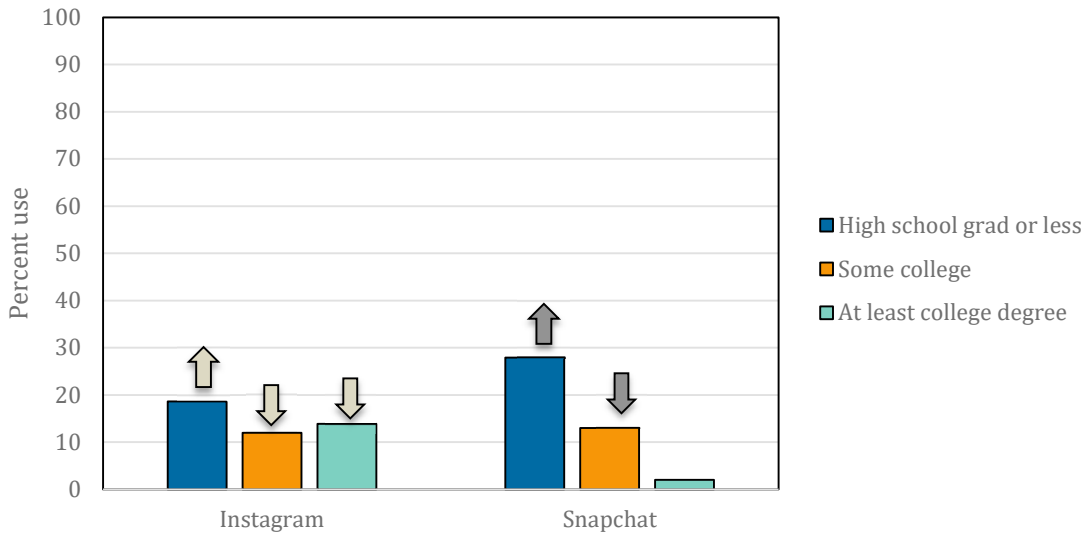


Figure 3.14. Percent of daily/every other day Instagram and Snapchat use by education among Minnesota State Survey 2016 social media users (n=581-582)

Note: up arrows indicate groups with statistically higher use, down arrows indicate those with statistically lower use. Color differences indicate groups between which differences exist.

- *Gender differentiated 2 of 6 platforms:* Females reported statistically significant more frequent use of Facebook than males (U = 29,048.5, p <.01; Figure 3.15, Tables D5 and D10) whereas males reported statistically significantly more frequent YouTube use than females, (U = 36,431, p<.01; Figure 3.15, Tables D5 and D10).

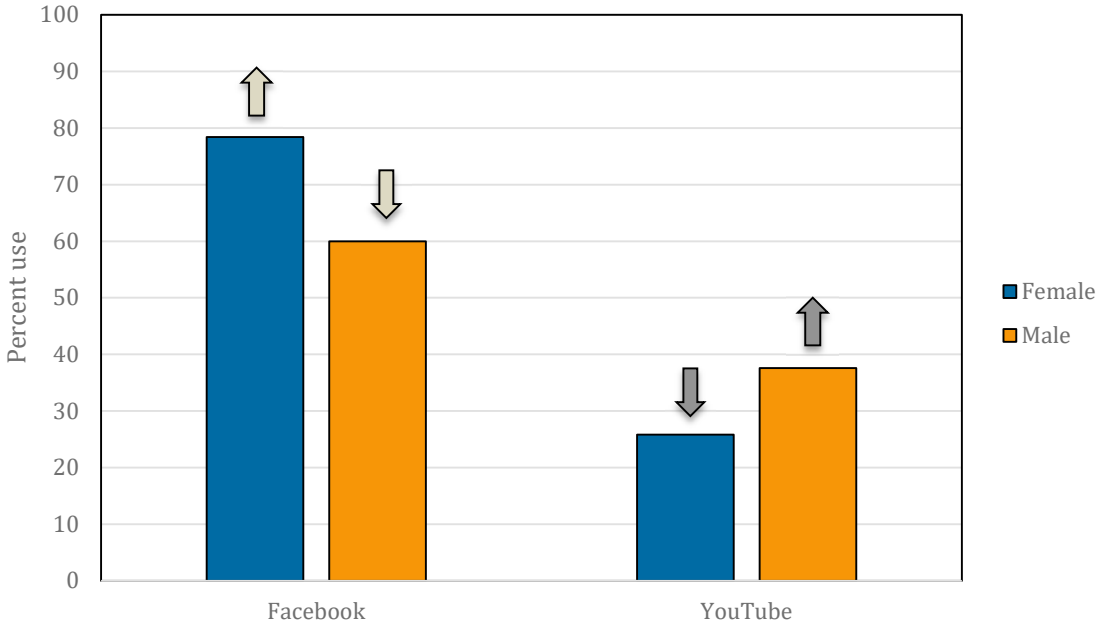


Figure 3.15. Percent of daily/every other day Facebook and YouTube use by gender among Minnesota State Survey 2016 social media users (n=584)

3.2.4 Interest in social media use for transportation planning

Overall, respondents were almost equally interested in all three uses of social media for involvement in transportation planning. Approximately 36% were interested in social media use for any reason presented (receiving information 37.3%; providing feedback 36%; making suggestions 35.4%; Figure 3.16 and Table D6). Interest was about 7 percentage points higher when considering only social media users (receiving information 42.9%; providing feedback 43.3%; making suggestions 43.5%; Figure 3.16 and Table D7). Social media users reported significantly higher interest in social media use for providing feedback and making suggestions than non-users (U = 22,474.5, *p*= .003 and U = 20,186.5, *p* <.001, respectively; Figure 3.16 and Table D8).

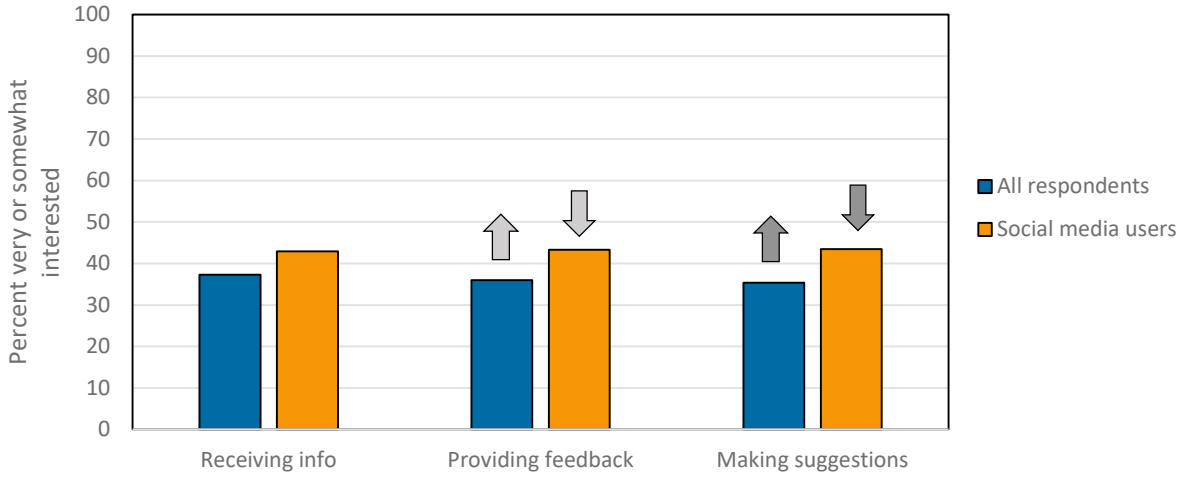


Figure 3.16. Percent very or somewhat interested in social media use activities for transportation planning among Minnesota State Survey 2016 respondents (n=813-816) and social media users (n=584-586)
Note: up arrows indicate groups with statistically higher interest, down arrows indicate those with statistically lower interest. Color differences indicate groups between which differences exist.

Location and race differentiated interest in all three forms of participation with social media while age differentiated two. Specifically,

- *Location*: Metro area residents were significantly more interested in receiving information, providing feedback, and making suggestions through social media than greater-Minnesota residents (U = 27,994, *p*= .003; U = 25,632.5, *p*= .009; U = 22,480, *p*= .003; Figure 3.17, Tables D6, D8).

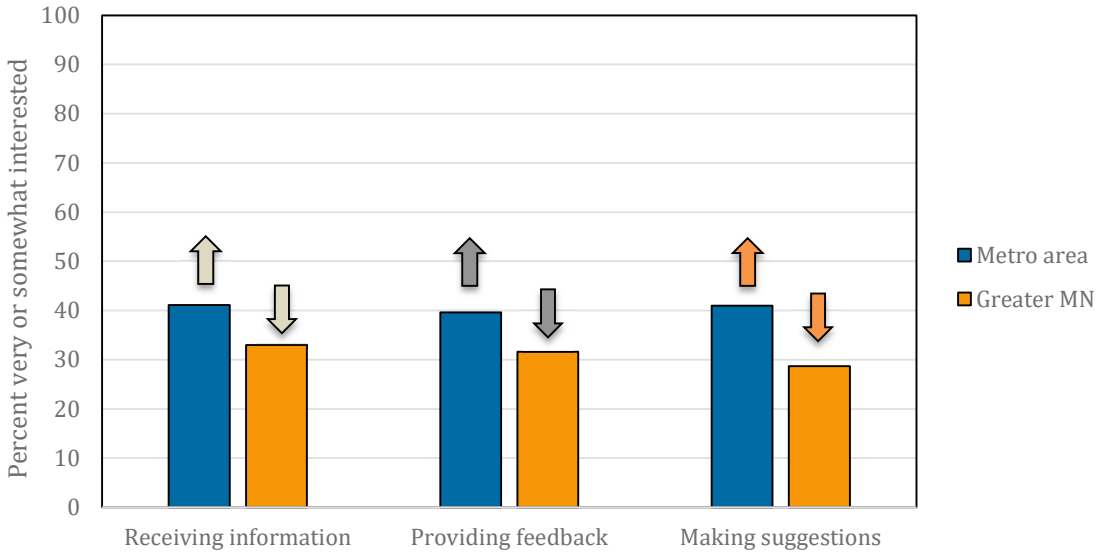


Figure 3.17. Percent very or somewhat interested in social media use activities for transportation planning by location among Minnesota State Survey 2016 respondents (n=812-816)

Note: up arrows indicate groups with statistically higher interest, down arrows indicate those with statistically lower interest. Color differences indicate groups between which differences exist.

Race: Non-Whites were significantly more interested in receiving information, providing feedback, and making suggestions through social media than Whites (U = 13,719, *p*= .028; U = 12,755.5, *p*= .005; U = 12,233, *p*= .004; Figure 3.18, Tables D6 and D8).

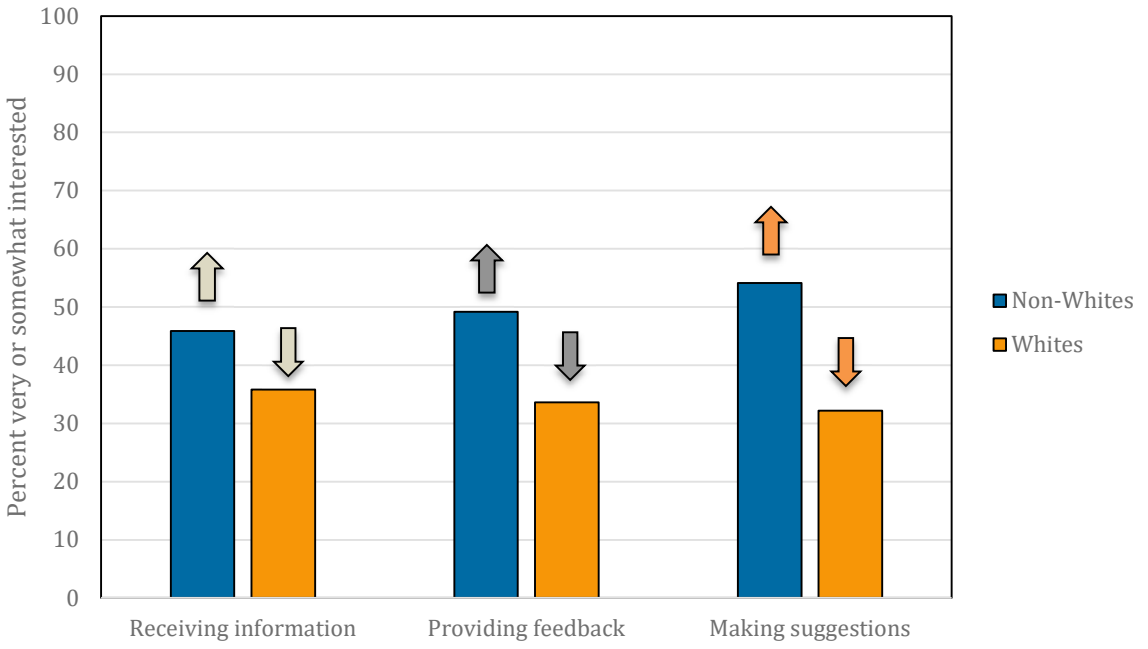


Figure 3.18. Percent very or somewhat interested in social media use activities for transportation planning by race among Minnesota State Survey 2016 respondents (n=792-795)

**Note: up arrows indicate groups with statistically higher interest, down arrows indicate those with statistically lower interest. Color differences indicate groups between which differences exist.*

Age: Those aged 30-49 were significantly more interested than those 65 and over in providing feedback and making suggestions through social media (H= 47.92, *p*= .005 and H= 36.69, *p*=0.033, respectively; Figure 3.19, Tables D6 and D9).

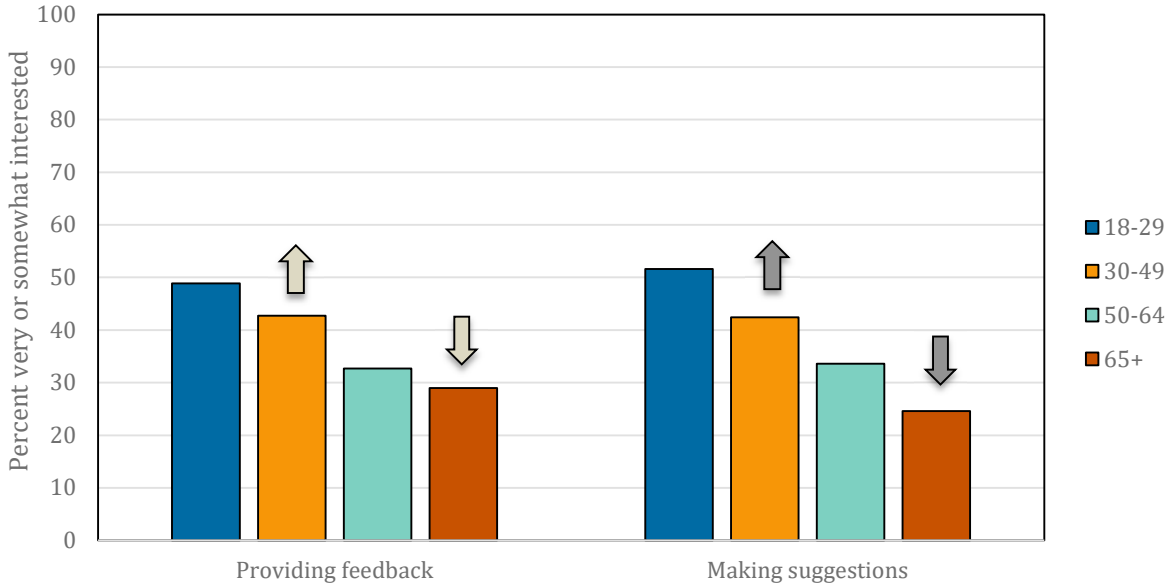


Figure 3.19. Percent very or somewhat interested in social media use activities for transportation planning by age among Minnesota State Survey 2016 respondents (n=772-775)

**Note: up arrows indicate groups with statistically higher interest, down arrows indicate those with statistically lower interest. Color differences indicate groups between which differences exist.*

3.2.5 Multiple Hierarchy Stratification predictions for public interest

When considering the combined effects of power and privilege on interest in social media use for transportation planning per the multiple hierarchy stratification approach, no discernible patterns emerged. If the MHS perspective significantly aligned with the model prediction results, odds ratios of interest in the e-participation methods would decrease across lower strata, in which members of society typically have less power and privilege. However, this was not the case in the Minnesota data. Rather, odds ratios rise and fall across the twelve strata with no discernable pattern. Strata #5 was predicted to as most likely interested in making suggestions through social media, strata #27 most likely interested in receiving information through social media, and strata #29 most likely interested in providing feedback through social media (Figure 3.20).

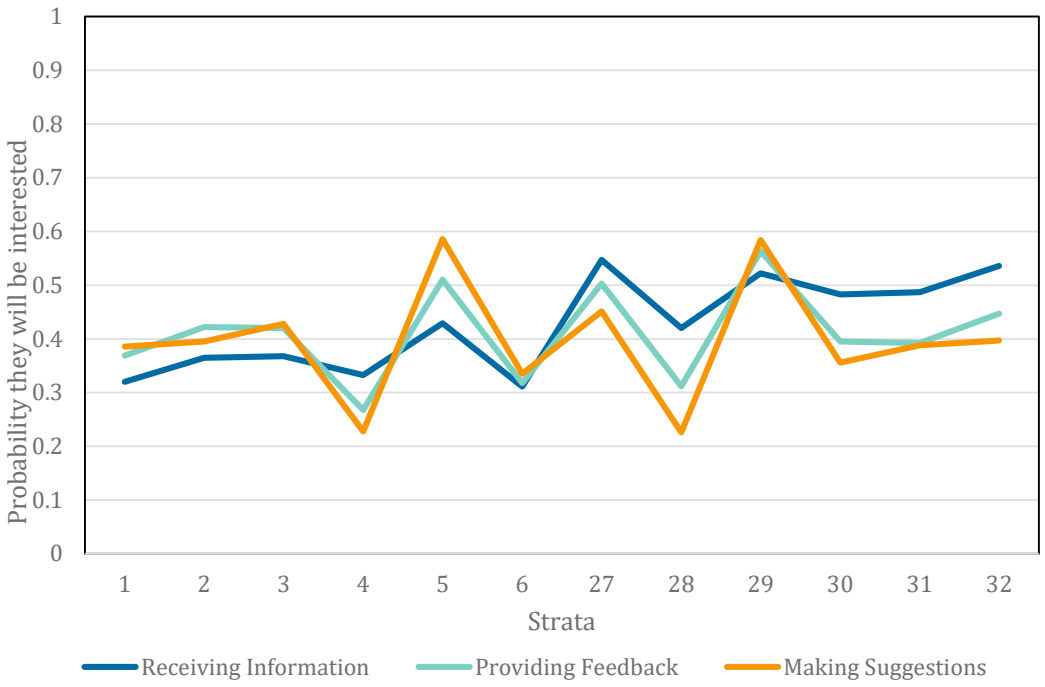


Figure 3.20. Odds ratios across demographic strata from multiple hierarchy stratification binomial regression model

3.3 DISCUSSION

Telephone interviews among a representative sample of Minnesotan's revealed between 11% and 21% participated in transportation planning, projects or programs. Although about 72% use social media generally, only about 16% used it for transportation planning purposes in the past 12 months. However, about 36% expressesd interested in the use of social media for transportation planning efforts. Subsequently, opportunities to increase public participation through social media appear to exist.

Understanding how participation in planning among Minnesota residents compares nationally is not possible, as data does not seem to exist on transportation planning involvement. However, information on general planning participation is available which indicates Minnesota and U.S. planning participation rates are similar in most areas: about 20% of U.S. adults attended a local meeting, contacted a government official, or provided public input via email in the last 12 months (Pew Research Center, 2013a). However, Minnesotan's attended local meetings less frequently and used social networking sites for transportation less frequently than U.S. adults who participate in general public planning (Pew Research Center, 2013a). Age, race, and location significantly impacted interest in social media use for transportation planning participation. Comparing interests among Minnesotans revealed non-Whites, Metro residents, and those 30 – 49 years of age expressed higher interest in the use of social media for engaging in transportation planning. The age differences mirror other social media platform participation rates where use generally decreased with age. As such, state transportation agency representatives' concerns that social media were least effective for reaching seniors hold (TRB, 2012). While significantly different, the location difference for social media interest seems unsubstantial. However, in non-metro counties with significantly aged populations, the prominence of social media in public engagement processes warrants serious consideration. When age, gender, race, income, and

education variables are combined into like groups and organized into strata, results from predictive regression models indicate that interest in e-participation does not vary significantly based on one's position in society.

CHAPTER 4: CASE STUDIES

This analysis assessed and compared actual social media engagement and perceptions of engagement on paired transportation projects in Minnesota: two with and two without significant social media use. Results illuminate social media use and ideas to optimize it in public transportation-related engagement.

4.1 METHODS

A mixed-method approach analyzed engagement in two sets of paired planning cases: one pair from greater Minnesota and the other pair from the Twin Cities metropolitan area. Each pair contained a case with a relatively high amount of social media use and a case with relatively low amount of social media use (Table 1). Social media data were collected and analyzed from the paired cases and interview data collected with key planners and stakeholders. This section addresses case study selection, social media data collection and analysis, as well as interview data collection and analysis (Key social media analytics terminology is defined in the glossary in Appendix I).

4.1.1 Case Study Selection

Several criteria enabled the research team and TAP to select appropriate cases. First and foremost, case studies provided comparison of major road improvement projects that did and did not use social media extensively. In addition, this "two-by-two" study design involved two projects from greater Minnesota and two projects from within the Twin Cities Metro area (Table 1). As recommended by Quick and confirmed by the TAP, each project is: 1) timely for analysis, 2) involved substantial outreach, 3) occurred in a community with an ethnically and racially diverse population, and 4) involves a project leader who was willing to be interviewed for this research. The compared cases are comparable in scope, level of public interest, engagement purposes, and originate from the same community type. The researchers compiled a list of candidate projects with the help of members of the Technical Advisory Panel (TAP). In early 2017, the TAP members and researchers mutually confirmed the two pairings that served as the basis for analysis.

Table 4.1. Pairs of case studies in Twin Cities Metro area and Greater Minnesota.

Social media use level/ Case locations	***High social media use***	***Low social media use***
Twin Cities Metro area	**Case 1A:** The Portland Avenue reconstruction project in **Richfield**.	**Case 1B:** The Snelling Avenue reconstruction project in the Hamline Midway area of **St. Paul**.
Greater Minnesota	**Case 2A:** The Highway 61 reconstruction project in **Red Wing.**	**Case 2B:** The Highway 10/59 reconstruction project in **Detroit Lakes**.

4.2 SOCIAL MEDIA DATA COLLECTION & ANALYSIS

4.2.1 Social Media Data Collection

Data acquisition occurred using a combination of methods: manual searches, targeted searches and platform metrics provided by page or account managers.

Relevant social media nodes were found by manual searches for key terms or hashtags relevant to these cases, informed by consultation with case personnel. In the case of Twitter, certain key hashtags were also identified (such as #CelebrateSnelling for **Case 1B**) and then manually searched to find related posts. Additionally, targeted web searches sought possible blog posts and forum posts relevant to each case. Streets.mn was identified as a host to blogs and forums related to a variety of transportation issues in Minnesota and was included in the data mining.

In addition, social media page administrators provided their Facebook Insights and Twitter Analytics respectively, which varied depending on the social media page settings and creation date. Official (e.g. city government) and unofficial (e.g. community created) social media nodes were data mined for all case-relevant information shared during and after each respective case's construction phase. Several interfaces were used to collect data: Facepager, NScrape, and Nvivo.

Both social media metrics and sentiment were of interest. Best practices and previous social media engagement research guided metric selection (Paine & Paarlberg, 2011; Mergel, 2013). Facebook metrics included (see Figure J1, Appendix J for data collection flowchart):

- reach (the number of people who view a post),
- impressions (total number of views of a post, includes non-unique viewers),
- comment details (number of comments, content, responses, sentiment and type of comments),
- number of post shares,
- number of post reactions, and
- IAP2 categorization of posts and responses.

Facebook Insights, provided by the respective social media account holders, provided the data on reach and impressions.

For Twitter, the respective case's social media account holders provided the data (see Figure J2, Appendix J for data collection flowchart):

- impressions (total number of views of a tweet),
- engagements (total number of retweets, replies, follows, clicks, and likes),
- reply details (number of replies, content of replies, responses, sentiment and type of replies), and
- IAP2 categorization of tweets and responses.

Twitter Analytics, provided by the respective case's social media account holders, provided the data on impressions, engagement, and account 'followers.'

YouTube metrics of interest included (see Figure J3, Appendix J for data collection flowchart):

- number of views,
- number of reactions,

- comment details (number of comments, content, responses, sentiment and type of comments), and
- IAP2 categorization of videos and responses.

Due to the limited use of YouTube videos, views, comments, likes, and timestamps were collected manually and all other data were collected by University of Minnesota personnel.

Demographic data (age, education and gender) were available through Facebook Insights and Twitter Analytics. Initial plans included further analysis by country, city, and language spoken. However, neither Facebook Insights nor Twitter Analytics data indicated users were outside of the United States. Data provided by official page personnel did not include information about user's specific location or their language spoken.

4.2.2 Social Media Data Analysis

Analysis occurred within RStudio and Microsoft Excel 2016. Descriptive statistics were calculated for demographic data and metrics of interest. Frequency of unique social media users interacting with the page was observed, as well as use of hashtags, social media user questions and answers, and differences in use between official and unofficial nodes.

Sentiment was analyzed using each individual comment as a unit of analysis. Sentiment was coded into positive, negative, balanced, neutral, or off-topic types (Table 2). To ensure sentiment coding reliability, comments were coded independently by two University of Minnesota personnel and then compared. Any differences were discussed and resolved through consensus.

Table 4.2. Sentiment analysis examples from MnDOT social media engagement case study project, 2017 (See Appendix C for Facebook screenshots of each sentiment type example).

Sentiment Type	Definition	Example
Positive	Supportive/happy/etc. with the construction/ the social media page	Nice realigned curb ramps! ☺ Glad those aren't so out of the way now!
Negative	Unhappy/frustrated/etc. with the construction	I am so sick of this construction. When is this going to be done? This construction did ruin two summers in a row. Not only this. My house vibrating like crazy. I am so concern about foundation of my house and my neighbors. Please help and for sure I need hand written certification from Richfield city by saying that nothing damage happen to my house during this long endless construction. ☹ [sic]
Balanced	Mixed elements of positive and negative sentiment	The medians are great! Marked crosswalks and refuge at every corner. As the trees mature, it will beautify the corridor and reduce speeds. I'm not a big fan of the center left turn lane, and would have rather seen a

		median or on-street parking. That aside, this sets a new standard for the lane streets in the county.
Neutral	Sharing or requesting information, little or no subjective content	What pipe are they replacing today in the 7500 block?
Off-topic	Not at all related to the construction project	Saw them in Tahoe last summer on the lake.

4.3 INTERVIEW DATA COLLECTION & ANALYSIS

Beyond the social media metrics, interviews with stakeholders ensued. Qualitative research methods were used because they are particularly well suited to analyzing people's values, perceptions, and preferences (Hennick, Hutter, & Bailey, 2010), which are essential to assess people's reactions to different engagement methods and processes. The researchers conducted semi-structured interviews with 39 individuals to collect original, primary data on stakeholders' evaluations of social media and other technologies for public engagement. See Appendix H for specific questions.

Gathering a diversity of perspectives and a combination of social media analytics and qualitative data from the interviews with key stakeholders allowed the research team to triangulate among various interpretations of the policy issue and public engagement processes (Altheide & Johnson, 1994; Yin, 2013) as well as perform comparative analysis across the four case studies (Eisenhardt, 1989; Yin, 2013). The researchers analyzed the data to find patterns, both in terms of convergence (i.e., strong consistencies in what study participants identified as advantages or disadvantages of using social media and other techniques) —and divergence (i.e., consistent patterns of difference among case leaders and low-income residents in their perception of how well an engagement process worked). Due to the project budget and timeline, the research design emphasized maximizing speaking with as many possible representatives of the broadest range of stakeholder groups possible; a much greater effort would have been required to reach a comparably representative number of members of the general public.

To discern these patterns, the goal for each site was to interview at least one person representing each of the following stakeholder positions (Bryson, 2004):

- local government project lead, coordinating jurisdiction (MnDOT or county)
- owner or manager of significantly affected sites (e.g., major employer, school, shopping center, health center, business owner, church)
- minority-oriented organization (e.g., Latin chamber of commerce, immigrant-serving business),
- other interest groups with a stake in the project (e.g., neighborhood association, mainstream chamber of commerce, cycling group, environmental group)
- local elected official
- unengaged, inactive stakeholder

Needless to say, the last category – the non-participant – was the most difficult to identify and even more difficult to engage for an interview, even with persistent effort to identify and find them through a "snowball" method (Atkinson & Flint, 2001) where each study participant is asked to identify and

introduce less engaged stakeholders in their networks. However, in most sites, interviews occurred with all of the above informant types.

Interviews occurred in person or by phone. Typically, interviews lasted 25-35 minutes. Permission to audiotape interviews was granted by 90% of study participants (36 of 39 persons interviewed). All recorded interviews were transcribed. In accordance with the researchers' commitment to the ethical conduct of social science researchers and in compliance with a protocol for the protection of human subjects developed and approved by the Institutional Research Board of the University of Minnesota (STUDY0000799), interviews were conducted exclusively with adults aged 18 years or older who provided voluntary, informed consent to participate. Confidentiality was promised to assure that study participants could speak freely, including to share their criticisms of public engagement efforts. To protect their confidentiality, quotations from study participants are not attributed by name, and there is no list of study participants in this report.

People familiar with the case study sites will observe that sometimes the study participants' feedback seems to relate not exclusively to the project at hand, but rather to a series of related construction projects or even more generally to the agency's usual patterns of public outreach and engagement. During interviews, the researchers tried to direct study participants' attention specifically to the construction project zone chosen for the case study, but were not always successful. Study participants' feedback reflecting those broader contexts are included in the data set for several reasons. First, in gathering data on study participants' perceptions, it is paradoxical and counter-productive to overly steer their perceptions. If a study participant is unable to parse an agency's outreach and engagement efforts about one segment of a road construction project from another, it is the judgement of the research team that it not only inauthentic to try to sterilize their interview statements from the broader context to which they are reacting, but indeed more productive for the agency in question to hear that broader feedback. In addition, at the request of MnDOT and LRRB project leads and the technical advisory panel, the researchers made a special effort to engage minority and hard-to-reach stakeholders, which meant that occasionally the study participants are individuals or representatives of organizations that were somewhat more peripherally involved in the exact project at hand, yet had important insights.

4.4 RESULTS: PORTLAND AVENUE, RICHFIELD – CASE 1A

Cost / Project: $8.9 million.

Timeline: Public meetings began in October 2013 and construction occurred from July 2015 - October 2016.

Location: Construction occurred along Portland Avenue in Richfield. The 2016 population of Richfield was 35,228, Median household income was $52,954, residents were 70% white, 9% black, .8% American Indian, 6.1% Asian, 18.3% Hispanic, and 3.5% two or more races ; 21% of residents were under 18, 14% were over 65, and 65% were between 18 and 65 (U.S. Census, 2016).

Figure 4.1. Portland Avenue case area
www.richfieldsweetstreets.org/portlandreconstruction

Project Summary: The key objectives were to address structural issues with an aging, heavily used road, and to use that opportunity to improve pedestrian safety and slow the speed of cars on the road. Construction improved the pavement conditions, replaced deteriorating sidewalks, and upgraded aging underground utilities while improving operational safety for pedestrians, bicyclists, and vehicles. Additionally, the project focuses on an increased livability of the corridor through enhanced aesthetics, landscaping amenities, transit facilities, and traffic calming measures.

<u>High</u> social media use as part of generally high-effort, multi-channel engagement effort: Social media posts related to project planning and construction were identified on four Facebook nodes, one Twitter node and one YouTube node. Four of these were official and two were unofficial.

Social media was used for four general purposes: 1) to draw people to and report on public meetings, 2) to provide routine weekly status reports on project progress, 3) to quickly relay information about road rerouting, and 4) to address questions posted by residents. Social media was part of a generally high-touch approach that also involved weekly contractor meetings, open houses, flyers delivered to every house, etc. The collaboratively-created guidelines for road construction and improvement were frequently referenced in decision-making for this project. The first open-house information session took place in October 2013 and public involvement and project visioning continued through April 2014. Public engagement and outreach on this project included postcards/mailers sent to the area of and around the project (notifying of open-houses, kick-off meeting, and neighborhood meetings), door knowing along the corridor, a dedicated project phone hotline, hosting multiple meeting, and areas of the city website dedicated to the project description and ongoing updates. The city maintains a website on transportation projects, budgets, and programming at www.richfieldsweetstreets.org/

Highlights of Social Media Analytics: Portland Avenue

Online discussion pertaining to Portland Avenue construction predominately on Facebook, with 154 Facebook posts and 544 Facebook comments.

- Richfield Community Page, an official Facebook page, had a comment density almost 6 times greater than the next most commented on node.
- Most comments were neutral (30-37%), with negative and positive comments occurring in similar frequencies (approximately 20% each). Approximately 5% of comments were balanced.
- Sentiment is similar across both official and unofficial notes, with the exception that unofficial social media nodes have 18% more off topic comments.

4.4.1 Social Media Analytics: Portland Avenue

Online discussions pertaining to construction along Portland Avenue in Richfield were nearly evenly split between official and unofficial social media nodes and occurred predominantly on Facebook. Most comments occurred on the Sweet Streets – City of Richfield Facebook page (237 comments) or on the unofficial Richfield Community Page (230 comments). The Sweet Streets – City of Richfield page had approximately 600% more posts pertaining to the topic (62 vs. 10 posts) but only 3% more comments, indicating posts on the Community Page had a higher comment density (23/per post vs 4/per post respectively; Table L2; Appendix L). There were 165 unique users who commented across all social media nodes. Users commented an average of 2.6 times across all nodes, however two outlier users commented 46 and 34 times respectively. Additionally, the Richfield Community page had a much larger number of average likes per post compared to the four other Facebook social media nodes identified (~27 vs 4-5 likes) and the Richfield Community Page had ~4600 members, compared to ~800 of Sweet Streets. There were 106 instances of users asking questions via Facebook. On 78 occasions, official social media node personnel answered these questions, while there were 54 instances of other social media users answering these questions.

There was an average of 554 impressions on City of Richfield Facebook posts, with a standard deviation of 589 and a maximum of 3264. On the unofficial Richfield Bike Advocates page, there was an average of 26 impressions per post, with a standard deviation of 52 and a maximum of 403 (Table L2; Appendix L). Reach varies by gender and age groups between Richfield Bike Advocates and the City of Richfield (Figure 4.2). While City of Richfield reached 20% more females than males, the percentage of male and female users reached by Richfield Bike Advocates was almost equal (Figure 4.2). For both nodes, those ages 25-44 made up the majority of users reached, while those ages 13-24 and 65+ varied between 1%

and 11% of the reached audience. (Figure 4.3).

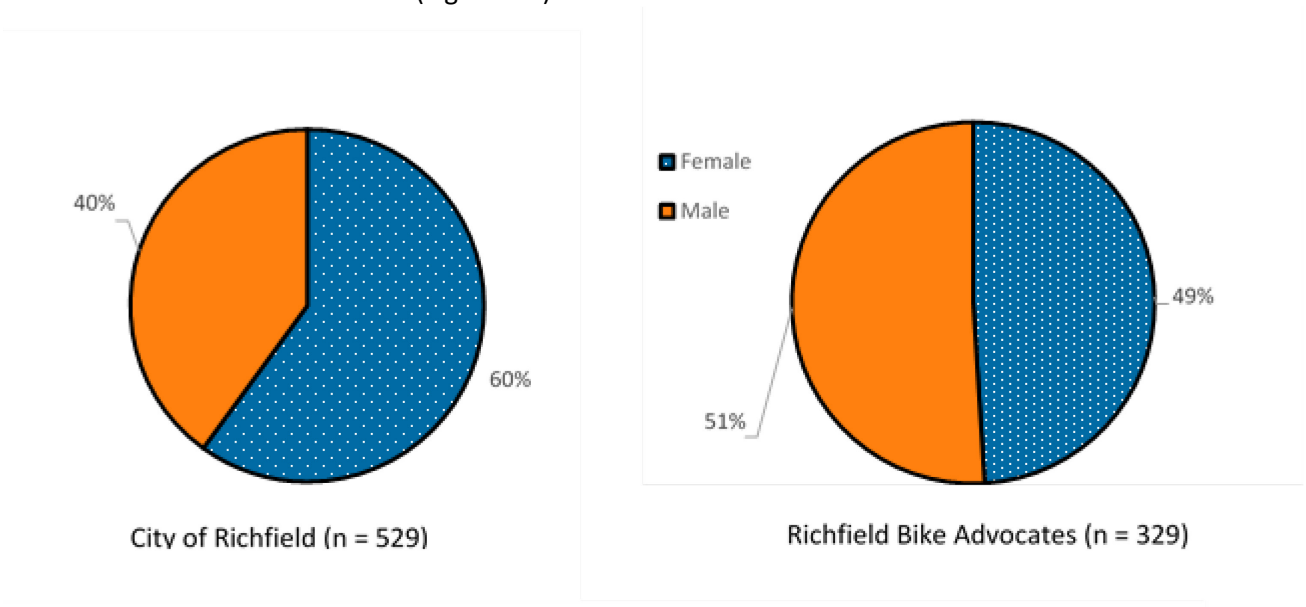


Figure 4.2. Reach by gender of Facebook pages of City of Richfield and Richfield Bike Advocates.

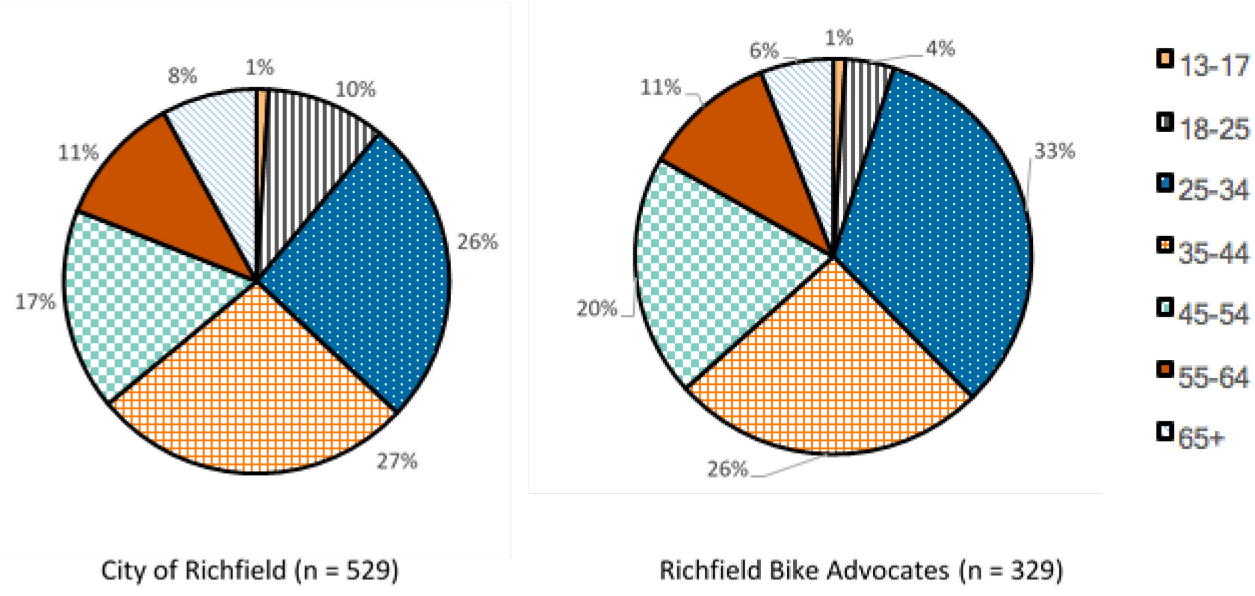


Figure 4.3. Reach by age of Facebook pages of City of Richfield and Richfield Bike Advocates.

The City of Richfield tweeted information related to Portland Avenue construction 45 times. Only a single tweet did not include an outside link to either the Sweet Streets Portland Avenue website information page or a different social media platform. There were no replies to these tweets, an average of .4 favorites, and an average of .31 retweets (Table L3; Appendix L). City of Richfield tweets had an average of 589 impressions, or instances of users viewing, liking, retweeting, or at all interacting with tweets. There was a standard deviation of 208 and the maximum number of impressions a tweet received was 1862 (Table L4; Appendix L). The City of Richfield YouTube page uploaded 41 videos related to Portland Avenue construction. Videos had an average of 147 views, zero comments, and .5 likes (Table L5; Appendix L).

On the website streets.mn, threads pertaining to construction in City of Richfield in general existed, as did threads related to construction on 66th street, and construction on 77th street, no but specific thread dedicated to Portland Avenue. However, across these threads, there were 10 comments related to Portland Avenue, of which four were balanced, three were neutral, and three were negative. There were no identified blog posts specifically related to Portland Avenue construction.

Social media was mostly used to inform users about Portland Avenue planning and construction. However, it is possible social media use across nodes fostered participation such as consulting or involving by attracting additional residents to participate in traditional engagement methods such as public meetings.

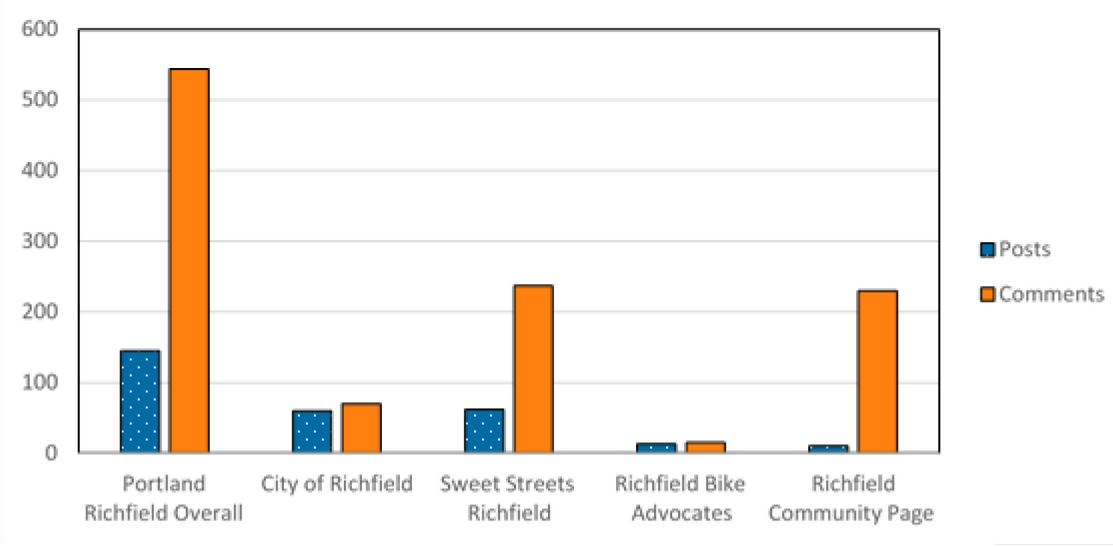


Figure 4.4. Portland Avenue Facebook posts and comments.

Sentiment analysis of all Portland social media comments indicated most frequently comments were neutral (30 – 37%), with negative and positive comments occurring in similar frequencies (approximately 20% each). Approximately 5% of comments were balanced (Figure 4.5). Unofficial and official node sentiment analysis indicates that sentiment is similar across both types of nodes, with the exception that unofficial social media nodes had 18% more off-topic comments (Figure 4.5).

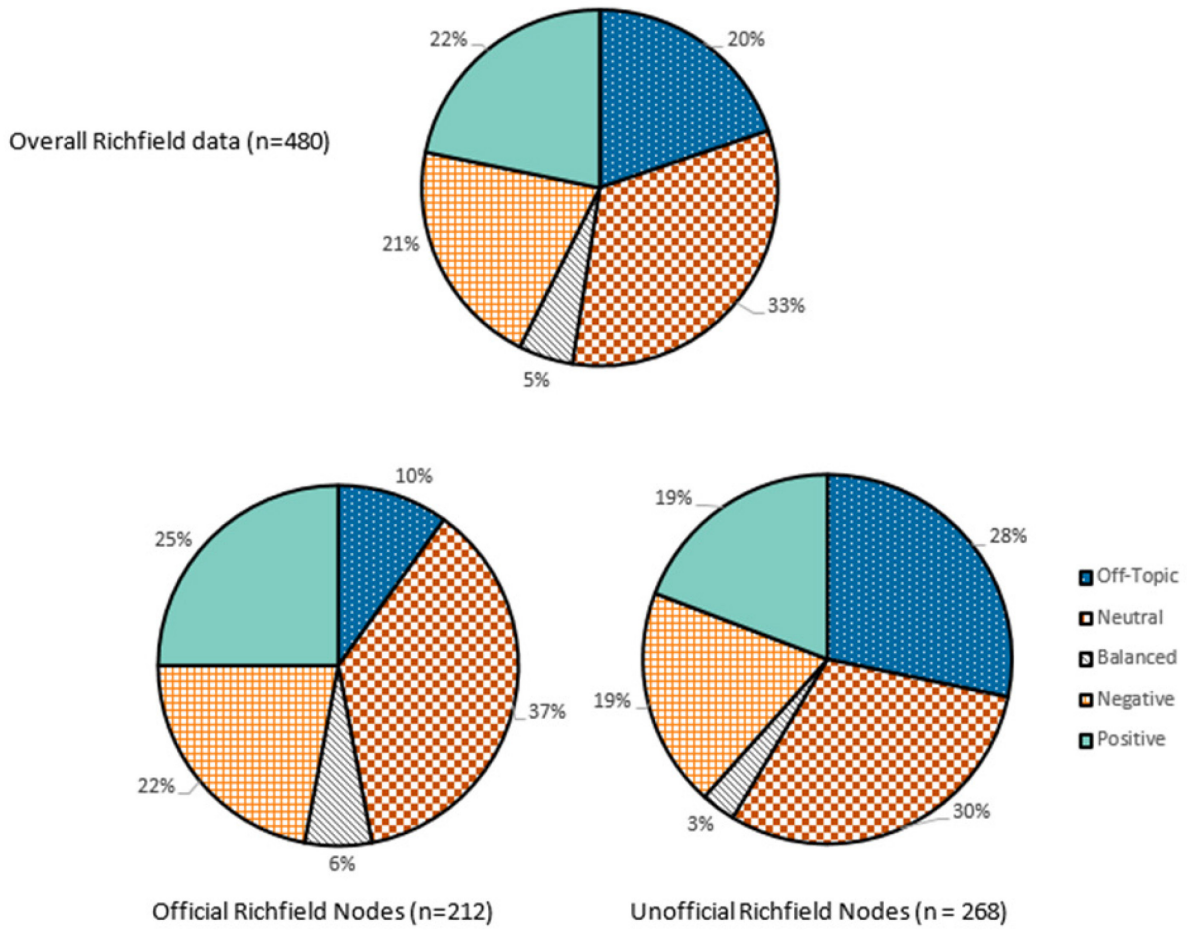


Figure 4.5. Comparison of sentiment analysis on Portland Ave overall data, official social media nodes, and unofficial nodes.

4.4.2 Interview Findings: Portland Avenue in Richfield

The researchers conducted interviews with ten individuals (6 individual interviews and two with pairs) connected with the Portland Avenue changes in Richfield. As discussed in the description of research methodology (above), this is not a representative sample. The research team tried to maximize diversity among study participants in order to approximate the full breadth of perspectives. This is important for learning; including people whose judgment of a project or perspectives are unusual can be useful for promoting reflective practice and growth. Collectively, the ten study participants represented a diverse range of affiliations, professional / lay perspectives (city staff, directors of strongly effected activity centers, cycling advocates, residents, and business people), ethnicities, places of origin, genders, and ages.

The key findings from the interviews are:

Using social media is necessary as part of a multi-prong strategy to reach diverse constituents. It is not a silver bullet. In the context of this study about whether increasing the use of social media improved

public engagement, interviews illuminate two essential features of that question: 1) social media is not technically complicated for public mangers to use, and 2) using social media and other engagement methods are not substitutable. With regards to the first point, the people interviewed who use social media in their outreach and engagement pointed out that using social media is highly cost effective, and thus hard to resist, although it does not reach everyone. Respondents insisted that using social media did not require extra time or skill. Instead, they suggest using social media effectively depends primarily on developing a habit of recognizing when to post something, for example if there is a project update or good occasion to do so:

> *We just tried everything to get the information out to everybody. We just [pause] that's what we do. I mean, I don't know that the Facebook really added that much time and effort. It does take time and effort, but it's not like we hired somebody new. We just do it. We have our tablets and iPads and stuff out in the field and so it takes us a couple of…I mean, less than a minute to throw something up there if we feel like it's important for the residents to know.*

The communities which are more extensively using social media are not doing so in favor of or as a replacement to other methods. The City of Richfield's planning and public engagement leaders for the Portland Avenue project, asked why they use social media, seemed surprised by the question and responded, "*Because it's what people want*." The city uses whatever methods they can to reach people in the ways they prefer to be reached, and was recognized for the comprehensiveness of its outreach efforts by winning the 2016 national award from the American Public Works Association for exceptional performance in journalism and outreach in recognition of its Sweet Streets website, social media, mailings, and advertisements (Rippke Lloyd, 2016). Similarly, communication leaders in the interest groups with a stake in the Portland Avenue project commented:

> *I think social media is effective in just that it gives us one more platform to post information on. You know, some people are great at emails. Some people are great at social media. Some people would rather have a phone call. Some people would rather have someone knocking on their door. So, social media is great. It's just one more avenue to get information out there. But you can only provide so many avenues before it's just someone's own personal responsibility to seek out the information that they're needing.*

Another reinforcement of the need for a multi-pronged approach comes from those who do not and cannot imagine using social media. So, while social media can expand access to people who prefer that mode of engagement, some of the people we interviewed felt it would be too much bother to use, like this manager of a service center:

> *It's not for me. I don't really do those social media things. I wouldn't know how to even look for that because you'd have to have a personal one, right? Like, you'd have to have…you'd have to sign on to the city's Facebook and Twitter? And who would ever want to do that?* (laughs)

Others were more receptive to the idea of social media, yet are not familiar with e-participation and had not thought to look into it. For example, some small business owners whom we interviewed liked the idea of being able to participate on their own time and in their own way, because they could not easily leave their establishment to go to a meeting. However, they would need more outreach and perhaps a personal invitation to be aware and encouraged to take the opportunity of online social media engagement.

Stakeholders experience the city's social media and other engagement methods as informative, and would like a more consultative approach and to use social media for education. The people we

interviewed who are familiar with the city's outreach efforts had positive reactions to the Sweet Street website. However, they also shared their observation that the city often used social media primarily to draw people to meetings or as an intake point to direct them to the right person to call – offline – for an answer to their question. In contrast, they were enthusiastic about opportunities to use social media platforms to get stakeholders dialoguing one another to debate, educate, and inform. In other words, they found that the city's efforts could best be characterized as "informing" – the lowest level of public participation and influence on the IAP2 Spectrum of Public Participation – whereas they would prefer something closer to "consulting" and "involving" the public in decision-making. Several suggestions stood out.

Several stakeholders recommended enhancing the City's social media and online tools to be more oriented to dialogue and consultation. They liked using Facebook pages for commenting and online dialogue, so that newcomers could see the answers to questions. Both city staff and residents told us they enjoyed seeing non-staff sometimes share their knowledge to respond to questions or correct misunderstandings posted on the city's Facebook page. Residents suggested that the City use the Facebook page more consistently for ***education***, both to answer specific project questions and to provide more general background about transportation issues. Three people whom we interviewed suggested moving beyond project descriptions and status updates to educate about "complete streets" and their benefits and rationale, and suggested this was particularly important for welcoming newcomers, especially immigrants and people of color. One suggested:

> *We have to be able to identify what [the most effective] types of platforms are but also support communities to learn about how they can get involved…. [to] let them know how the planning process works, transportation, all these different things…. Facebook and social media are a way, but at the same time, I think we could utilize them better if we have a little bit of that back and forth learning together…. When it comes to Sweet Streets, that would include, you know, how to use a roundabout, how the new configuration of Portland Avenue is actually safer and, why multi-modal is important and all of that.*

This educational approach is potentially an added dimension of what is essentially still a unidirectional approach that would be characterized as "informing" on the IAP2 Spectrum of Public Participation. In addition, however, several stakeholders suggested enhancing the City's social media and online tools to be more oriented to ***dialogue and consultation***. They recommended including simulators that people could use to visualize different road treatments and their effects on movement, polls about commonly used routes or transportation preferences, and other more interactive content for learning about and providing feedback on projects. This echoed their enthusiasm for more interactive approaches offline as well, for example a pop-up display at a Richfield community fair where people could walk through, ask questions, and make suggestions about a full-scale model of the complete streets approach proposed for Portland Avenue. They also recommended that city staff should participate more in the unofficial, community Facebook page, which they assert – and our social media analytics demonstrate – was often far more active on the Portland Avenue project than the city's own page. Notably, this was confirmed by study participants who said they would not think or want to go to the city's website or Facebook page, yet made references to related postings they had seen on the unofficial Richfield Community Facebook page.

Different demographic groups seem to have their own preferences for social media and engagement methods. The most prominent theme we heard in the interviews was about perceived preferences based on age. Leaders in three different interest groups mentioned age as an explanation for their use

of social media, either to explain why they emphasized it or why they found it unhelpful. One of them summarized the point like this:

> *We have a lot of senior housing in Richfield, so they're not necessarily going to be Snapchatting everything. But if you're hitting neighborhoods that [have] young families or apartments where young professionals live, then maybe you have a better shot at that. So, for the planning process in terms of how you get information out, that might be one thing to look at in the future: What exactly is the demographic along whatever the route is? And then pick the platform that best targets the majority of them.*

Decision-makers' connections and engagement with ethnic minorities and immigrant communities in the city are generally poor. In-person outreach is particularly important. Despite the fact that persons of color and indigenous people comprise at least one-third of city residents, study participants with quite diverse points of view consistently indicated that the city is not engaging them effectively. To their credit, the city leadership team for the Portland Avenue improvement project were particularly interested in what they could learn from this study about reaching diverse populations, implying that they see this as a priority area for learning and improvement. Unfortunately, no one could name an engagement method that they had successfully used to engage underrepresented populations. The interest groups who had been doing their own outreach and organizing about the project could not easily identify any active, non-white participants in their networks.

Although these constituents were not visibly engaged, they were certainly impacted. Representatives of enterprises that were owned by and/or primarily served immigrants asserted they had not been consulted about the project. Despite being technically just outside the improvement zone, the owners or managers of these operations felt they had been strongly impacted by customers' avoiding their business during periods when Portland Avenue was closed for construction. They asserted that they "*might have gotten a letter, but didn't realize construction was going to happen until the [road closure] signs started going up*." Importantly, they acknowledged, "*Okay, these things [road improvements] have to get done*" and did not object to the project. However, they also scoffed at the question about whether they did or did not like the project, because they seemed to believe it was ridiculous that the city would even consider their preferences and involve them in planning. One small business owner expressed a feeling that "*We are just ants*" who have no power compared with a city government.

This implies that what a city government could interpret as agreement with a project might instead reflect a lack of confidence that residents are entitled to or would have any influence on policy-makers, due to some combination of past experience with the specific government, an impression that immigrants may not be heard and respected, or expectations about government-public interactions based on their place of origin. Remedying this situation will require long-term efforts to build relationships, and several people whom we interviewed specifically called for the city to invest in becoming more culturally competent in reaching out to diverse groups. That said, the representatives of immigrant establishments with whom we spoke had several modest and actionable requests for future projects. Their suggestions for improvement were very specific: (1) They wished they had been visited much further in advance, so that they understood how hard their establishment would be to access and could better prepare their clients and do more to retain them during the construction period; (2) They would specifically would have preferred an ***in-person visit,*** and seemed genuinely perplexed by the idea that their visiting city hall or a community meeting would have made any difference; and (3) They requested some small consideration in the project – for example, improving the sidewalks or boulevard plantings in front of their shopping center – to help attract clients and compensate for the lack of business during construction. Interestingly, our discussion with a manager of another center serving

people who are frequently marginalized – individuals with mobility impairments and other disabilities – also emphasized that they would have liked a personal consultation, including a visit from the city to their facility – about what was coming, some of their needs for the final design, and anticipating the impacts.

4.5 RESULTS: SNELLING AVENUE, ST. PAUL – CASE 1B

Cost: $13.2 million

Timeline: Public meetings began in July 2014 and construction occurred from May through November 2015

Location: Construction occurred along Snelling Avenue in the Hamline Midway and Union Park District neighborhoods of St. Paul.

- The 2015 population of Hamline Midway was 12,435, median household income was $50,750, residents were 5% Asian, 14% Black, 71% White, 6% Hispanic, and 4% two or more races, and residents were 20% <18, 73% 18-64, and 7% 65 years or older (MN Compass, 2017).
- The 2015 population of Union Park District was 17,773, median household income was $53,710, residents were 3% Asian, 0% Black, 78% White, 6% Hispanic, and 2% two or more races, and residents were 17% <18, 73% 18-64, and 10% 65 years or older (MN Compass, 2017).

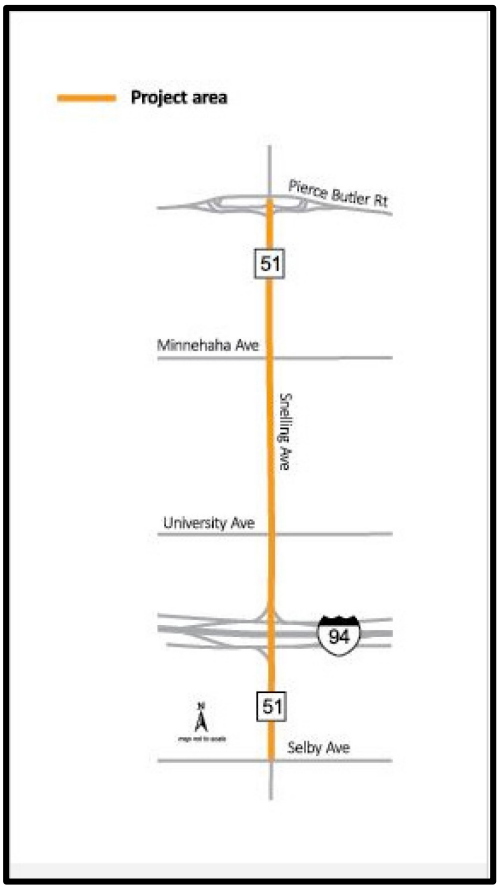


Figure 4.6. Snelling Avenue case area (http://www.dot.state.mn.us/metro/projects/snellingfalconheights/)

Project Summary: Existing pavement was resurfaced between Selby Avenue and Pierce Butler Avenue, Snelling Avenue Bridge was closed and re-decked, pedestrian crossings were updated to meet modern accessibility standards, drainage was improved, and four bus rapid transit platforms were constructed. Additional sidewalk and boulevard was constructed, medians were landscaped, and decorative twin lantern street lighting was added. This project included the busiest street intersection in Minnesota, and there were 108 businesses directly within the construction zone, including many businesses and services owned by and serving recent immigrants and people of color.

Public engagement was extensive. Social media was <u>not</u> central in this project, but was incorporated as part of generally high-effort engagement process that emphasized one-to-one connections with key stakeholders.

Social media posts related to project planning and construction were identified on seven Facebook nodes, three Twitter nodes and one YouTube node.

Generally, social media was *not* heavily used for the project. Social media was used to 1) announce open houses for planning, 2) announce lane closures and other construction updates, and 3) convey impactful changes faster than they could in a news release. Social media was part of a prioritized personalized approach in which the project team was on the ground, where they frequently walked the project, going door-to-door to meet with stakeholders, and built relationships.

Highlights of Social Media Analytics: Snelling Avenue

- Online discussion pertaining to Snelling Avenue construction occurred on four Twitter nodes and five Facebook nodes, the most number of nodes of any case.
- Sentiment analysis revealed most comments were neutral (37%) or negative (33%), followed by positive (11%), off-topic (11%), or balanced (7%) comments.
- Utilized hashtags #ShopSnelling and #CelebrateSnelling to organize construction related posts.

4.5.1 Social Media Analytics: Snelling Avenue

Online discussion pertaining to Snelling Avenue construction occurred on Twitter and Facebook in similar frequencies. Discussion was spread over several official and unofficial nodes.

Union Park District Council, a neighborhood association, had the most Facebook comments (14 comments) and posts (13 comments; Table L1; Appendix L). However, MnDOT and The City of St. Paul Facebook pages had much larger number of page likes, about 35,000 and 23,000 respectively. MnDOT's Facebook had an average of 1569 impressions, with a standard deviation of 1742 and a maximum of 7469 (Table L2, Appendix L).

There were six instances of users asking questions pertaining to the construction project on Facebook, two of these were answered through the Union Park District Council Facebook page-by-page officials. MnDOT's Facebook reach audience was 42% male and 58% female, and reached predominately those ages 25- 44 (Figures 4.7 and 4.8).

Across four different Twitter accounts and relevant related hash-tagged tweets, there were 36 related tweets and four replies. Tweets were favorited an average of .94 times and had an average of 1.42 retweets (Table L3; Appendix L). Estimated Twitter users for Met Council were almost equally male and female predominately those ages 25 -44, and almost half had only a high school education (Figures 4.9, 4.10, and 4.11).

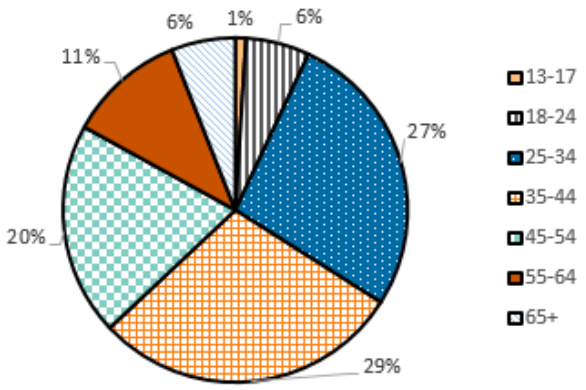


Figure 4.7. MnDOT Facebook reach by age (n=287)

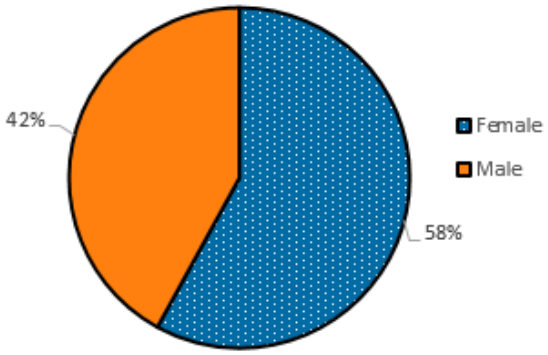
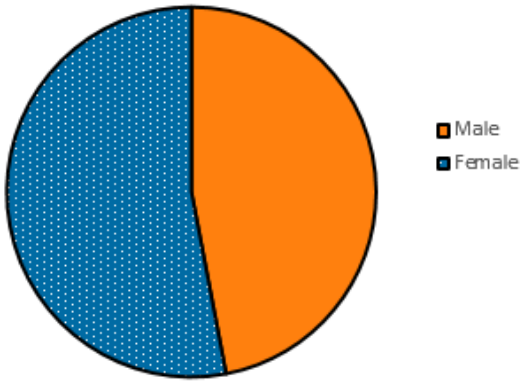


Figure 4.8. MnDOT Facebook reach by gender (n=287)



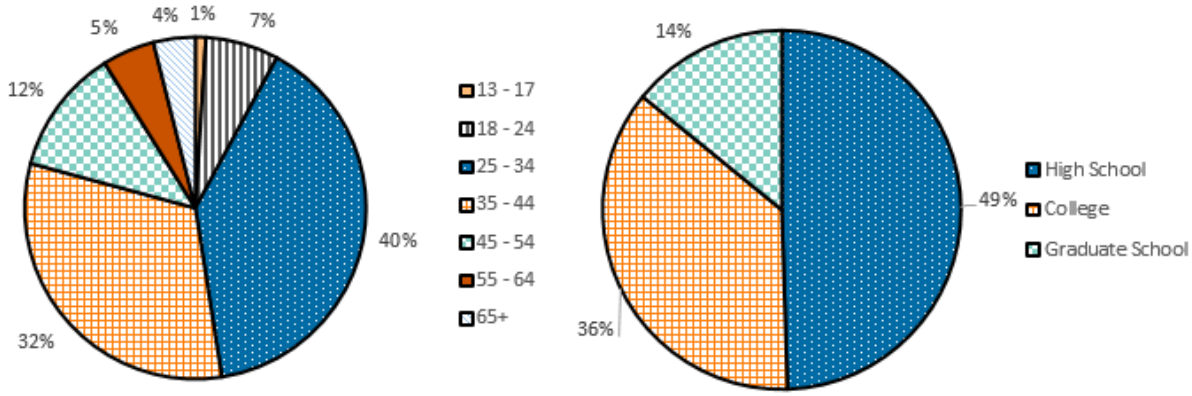


Figure 4.10. Met Council Twitter audience by age.

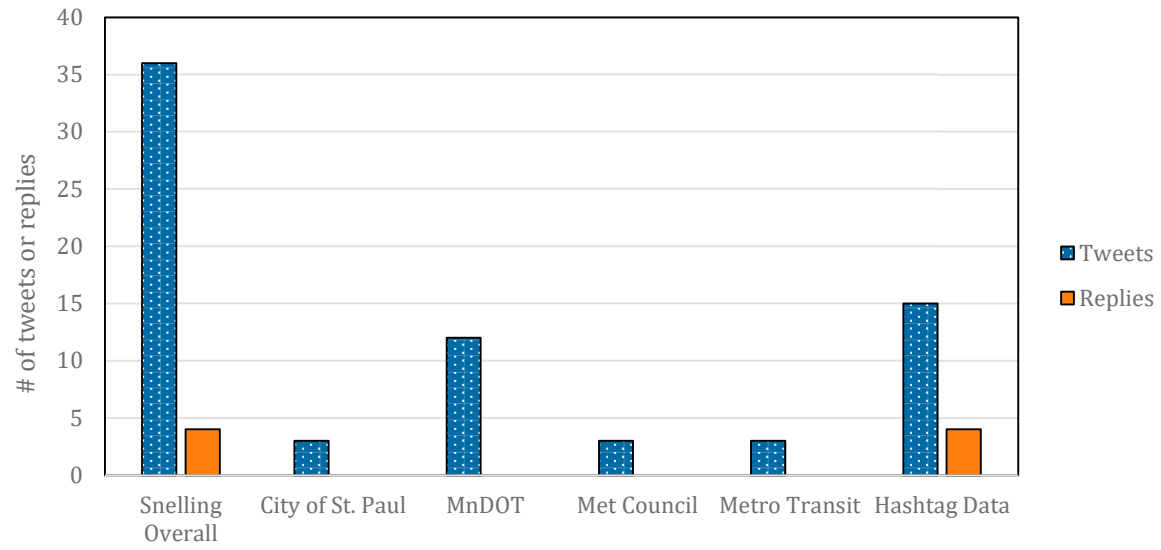


Figure 4.12. Tweets and replies related to Snelling Avenue construction by Twitter node.

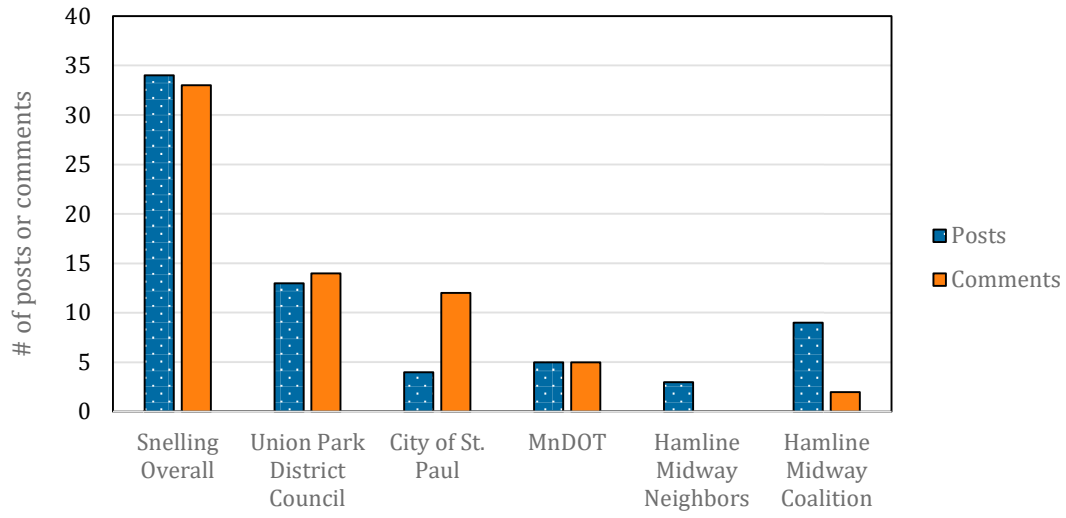


Figure 4.13. Facebook posts and comments related to Snelling Avenue construction by Facebook node.

The modest social media use may have supplemented traditional engagement efforts, however, overall social media data indicates it was used to simply inform users about Snelling Avenue planning and construction.

Sentiment analysis revealed most often comments were neutral, followed closely by negative comments (37% and 33% respectively). Positive and off-topic comments occurred equally (11%) and 7% of comments were balanced. This is somewhat with the results of MnDOT project staff own survey of project stakeholders, in which approximately 40% rated the project positively, 40% neutrally, and 20% negatively.

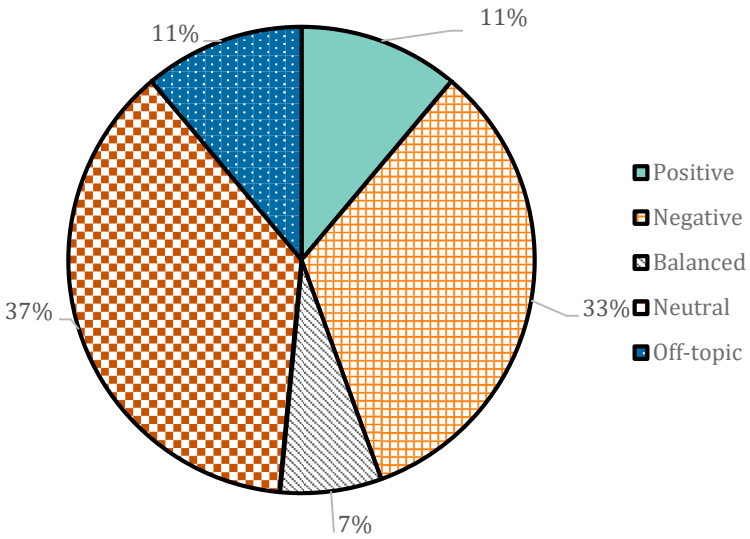


Figure 4.14. Snelling Avenue comment sentiment analysis (n=27).

4.5.2 Interview Findings: Snelling Avenue in St. Paul

The researchers conducted interviews with eleven individuals who were stakeholders in these Snelling Avenue changes. Again, as discussed in the description of research methodology, this is not a representative sample. The research team tried to maximize diversity among study participants in order to approximate the full breadth of perspectives. Collectively, they comprised three planning or outreach leaders from jurisdictions involved in the project, five businesses or organizations owned and/or oriented primarily to serving immigrants or persons of color in the immediate area, and four establishments in the construction zone. (These are non-exclusive categories; some businesses are both located in the construction zone and immigrant- owned and oriented, for example.) Study participants included six men, five women, and persons aged approximately 30 to 70. As mentioned in the discussion of overall research methods for these four mini case studies, the small number of interviews - especially for a setting with such diverse stakeholders and points of view - cannot be considered to represent all views comprehensively or proportionally. Because the emphasis in this study is to help advance understandings of the promise and pitfalls of these emerging technologies for engagement, the study was specifically designed to gain as diverse a range of perspectives as possible, to illuminate nuances in reactions to social media from different points of view.

The interview data were difficult to summarize succinctly because of the setting complexity and the diverse points of view of the interviewees. There were multiple agencies interacting, the stakeholders were highly diverse in nearly every respect imaginable, and multiple prior transportation projects (recent, upcoming, and as far back as 50 years) strongly shaped stakeholders' expectations and experience of the public engagement and transportation features of this project. Among the many nuances, however, the following themes emerged strongly and consistently.

Social media is valuable as part of a multi-prong approach to reach and interact with diverse constituents, particularly to provide timely updates on construction and navigating the project area. The people interviewed had divergent views of social media use, indicating that it is vital to utilize multiple channels to engage the stakeholders in this project. Notably, some of the people whom we

interviewed were unenthused about any form of outreach except social media, such as the proprietor of an immigrant-owned and -oriented small business. This individual had been lukewarm to all of the researchers' questions about different ways for the project leaders to communicate with stakeholders until asked about Facebook and Youtube, at which point he interrupted enthusiastically to say "Yeah, it sounds good to me, because then we can know about the process and get updates quickly from social media."

In fact, all of the individuals interviewed who had an establishment - a business, church, or service center - on Snelling in the construction zone -- were particularly eager for the kind of information that social media can easily convey: reliable, current information about construction updates, closures, and detours- so that they could anticipate and advise their customers, clients, or congregants about how to navigate to their establishment during construction. Indeed, the MnDOT project managers described using social media specifically for the purpose of pushing out information about sudden changes and important updates; they often used Twitter to reach traffic reporters, for example, who would promote the information to their followers, but wouldn't necessarily receive or pay attention to a traditional news release that would be sent to the newsroom. Generally, the MnDOT project managers found the ease of having social media posts shared, reposted, and retweeted very useful for expanding their reach and for learning about other stakeholders with whom they should connect.

On the other hand, social media is not a viable way to reach some individuals. The two oldest people interviewed (both women in their late 60s) repeatedly asserted that they were thirsty for more information about the project, yet never mentioned social media as a preferred way to receive or share updates with their constituents, and indeed seemed oblivious to the fact the project had used social media. When asked about social media, they acknowledged its usefulness for reaching younger people, but still strongly recommended the local neighborhood newspapers as a better way to get residents' attention. Similarly, a staff member of one of the two district councils in the project area observed that they needed to have a social media presence so that people could find them if needed, yet found the local newspaper was a better way to reach people:

> *Once the Snelling construction actually started, I think our role and goal was to try to be as visible as possible so people know that if they have concerns or complaints about the construction process, that they can reach out to us and that we can hook them up with people who can help address the problem. And so we do that through our Facebook page and social media and our website. The district councils in the area have regular columns in the local newspapers, and I think that that actually is probably more widely read than anything else* [laughs] *that we put out because* [local newspaper] *has such a huge distribution area and a good reputation as a local paper.*

Stakeholders caution against using social media to convey or discuss complex or contentious issues. While the Snelling Avenue project managers found that social media could be a good way to become aware of and respond quickly to misinformation, others had grave reservations about precisely the opportunity for incorrect information, misinterpretation, or overly fast judgement when using social media. A proprietor who had previously felt misinterpreted when they publicly expressed their reservations about a related transportation project explained:

> *With social media, here's so many opportunities for misinterpretation, and you start nothing but a silent social badgering and usually it does not come out positive when people come to that point…. I understand that social media is an extremely useful tool in a lot of ways, unless it's all*

good and fluff -- like telling someone how beautiful they look or how wonderful things were at the concert... but when it gets down to debating? Mmm, it's dangerous. Dangerous format.

A community organizer expressed a similar concern that social media was not well suited for discussing complex transportation projects:

People using social media tend to react quickly and to other people's comments and sometimes tend to say things that don't have an informed opinion behind them, and that might be more inflammatory than things that people would say in person. And it's also a lot harder because with a transportation project, there's usually a lot of complications. I'm thinking about this [previous] traffic calming project that we were involved in with the city. It was complicated with a lot of information to digest... Trying to have a robust conversation and convey all of that over social media was really, really hard. When people did engage, it would be kind of jump-to-conclusion type of conversation... as opposed to when we all sat down and talked out all the options and shared the pros and cons and why certain things were happening.

Social media - or any other engagement method - is appropriate and effective only to the extent that trust is present or built. Both of the interviewees who are part of and do their organizing within immigrant communities or communities of color emphasized this point. Their message is that trust is foundational, and that the mechanism of interaction - a meeting, online interaction, in-person meeting - is almost irrelevant unless and until relationships are built. A leader in the African immigrant community stated this bluntly:

There's a disconnect, when you invite people who are already in need - meaning their income - to set aside time to come to your meeting or to have time to use the Internet to respond to a survey, they don't have time. They're working two or three jobs and have family, and also they don't even trust you! Sometimes, even if you go to their place, they might feel you're invading their space, unless you've built that trust relationship. That happened with the [previous light rail project] on University Avenue. Trust is not a transaction. You build relationships, right? It takes time.

This individual's point was not that trust cannot be built, but rather that it takes time, and furthermore that there are often community organizations, which already have relationships of mutual trust with these communities, that it would be good to involve. (The research team notes that MnDOT staff have already recognized the value of this approach and begin to implement it more than at the time this project was being implemented.)

Independently, a community organizer with an organization specifically oriented to low-income people, primarily racial and ethnic minorities, pointed back to the issue of trust and respect as the foundational issue. Asked whether the transportation project leaders could best build relationships with his community "over social media or does it need to be in person or can it be a little bit of both," he observed:

I think it can be both. Again, the most important thing is building trust, and it's easier to ignore people on social media. If you're having a bunch of back and forth on social media and then ignoring all that feedback, that's not building trust or creating real avenues for voices to be heard. That's another way to tokenize people. Social media is definitely a tool in the toolbox, but the goal is building real relationships and hearing voices, especially voices that are generally ignored and suppressed and have been impacted by structural racism and structural inequities.

One-to-one, personal relationships with the responsive public engagement specialists in this project were valued. The project leads from MnDOT, in addition to spending a lot of time walking the project area, greeting and getting to know people, and having meetings in locations and times that would actively support local businesses, said that they "made a commitment to keep our cell phones on us and answer them" when stakeholders called. Two other stakeholders, when interviewed, specifically mentioned how impressed and reassured they were to have this contact. A community organizer mentioned,

> *There was a staff member who was primarily supposed to be reaching out to the businesses in the area and talking to them about potential impact, but ended up also being a great community liaison and I had his cell phone number and I could call him up and I'd run into him in the community and he'd give me a big hug.*

Previously existing, trusted community organizations are vital hosts and liaisons. Stakeholders often described longstanding organizations - district councils, community organizers, or service / advocacy nonprofits oriented to particular immigrant groups -were highly valued as go-to resources, advocates, and bridges between communities and the project. Several community-serving organizations that were on Snelling or located right off of it insisted that they had not received letters in advance about the project. MnDOT may well have sent some correspondence that was overlooked, as one resident said,

> [people might] *not read what you send them or they read it, but they don't understand how it's going to impact them until their street's closed off and the work crews are [already] coming into their front yard.*

Whether MnDOT did or did not send a letter, people's solutions to become informed speak to their heavy reliance on trusted liaison groups as a source of information and updates:

> *I have no idea why we weren't informed. I'm sure the Union District Council will have more information to be able to let people who live here as well as work here know of upcoming changes. If they aren't on it, we certainly aren't getting anything coming to us here by way of email or a letter or whatever.*

Liaison groups are especially important for hosting and connecting communities of color and immigrants. Where they are not well supported, the project may fail to engage important stakeholders. Culturally responsive and representative liaison groups are excellent conveners and hosts of a welcoming space. However, one of the challenges of this project, according to two community organizers who work with communities of color and immigrant- owned or oriented organizations, was that this was a "*missing part*" of the project:

> *For Snelling, I didn't see any resources allocated to create a support system for the communities we serve, which became a challenge because organizations like us can do the work when we have resources allocated.*

Another observed that he would have liked to see something different happen with his organization (which is not to say that MnDOT was not doing similar work with other organizations in the project area), namely:

> *If someone reached out to me and was, like, 'Hey, we'd like to hold a public info and input meeting about this project. Can we have a meeting at your shop? And we'll provide the food.' And that's the type of thing that I'd love for someone to call me and ask, but no one is. I think*

effective community engagement does is it comes to people where they're at, to meet them as much as possible on their terms rather than on the city engineer's terms.

This is skilled work that requires resources to support people's time and preferably also resources for residents or business owners to assist them through an impactful period of construction. The absence of such a commitment - as attested to by two groups that work specifically with immigrants and people of color in the project area - raises a good point about whether, although the outreach from MnDOT and the district councils and chamber was good, there should not have been more connection with and resourcing of liaison groups on Snelling.

Stakeholder reactions to the Snelling Avenue project and the engagement efforts must be understood and planned in the context of multiple other transportation projects - past, present, and anticipated - in exactly the same area. As mentioned above, the foundation for any engagement is having, building, and maintaining trust, which in this particular case was challenging because of a long and sometimes fraught history of many transportation improvement projects that have strongly impacted residents and establishments in the corridor, often detrimentally. Clearly, a project of the scale covered in this case study is signifi0cant in its own right. However, seven different study participants made it clear that they could not make sense of this specific Snelling project in isolation from an extensive -- and often fraught -- history of other projects.

Notably, several referenced the destruction of a large swath of homes and businesses - including Rondo, one of the city's largest and most vibrant black neighborhoods - to build Interstate 94 through the area in the 1950s. Although this may feel to an outsider like the distant past, multiple stakeholders mentioned it, including this church leader:

When 94 was constructed back in the [19]50s, that was big. The people who lived in the neighborhood at the time lost their homes. They were displaced. I don't know what kind of communication went on at that point in time. But it helps to know, ahead of time. People aren't as anxious when they know. Communication is a big one. You can dispel a lot of people's anxiety and fears ahead of time so they're less likely to be against something if you keep people informed.

A community organizer who works primarily with persons of color in the area also explained how this history exacerbated mistrust:

Even if the baggage of distrust from black residents of Rondo to government agencies are a higher level than in most other situations, there's a lot of mistrust of government, in general.

In addition, a light-rail line was recently constructed and now operates on University Avenue; it crosses Snelling Avenue right in the center of this project zone, right at the busiest surface street intersection in the entire state. This is the project that an immigrant leader was referencing when he explained, "U*nless you build that trust relationship, you don't trust them in the first place, right? And that happened on University Avenue…"* In parallel with that, a new bicycle boulevard was created, complete with some parking restrictions and a new median that now prohibits crossing or turning where it intersects with Snelling. One stakeholder could not respond to questions about the current project without revisiting grievances over the decision-making process and infrastructure outcomes of that project. Feeling the previous invitation to engage was disingenuous, this individual asserted they would never want to try again, despite the fact that the bike project involved the City of Saint Paul, not MnDOT.

The tail on these projects is long, and cannot be avoided, even for projects being sponsored by and people working for a different jurisdiction from the previous one in which distrust, cynicism, or a loss of legitimacy accumulated. The project managers acknowledged they were aware of the history and tensions over the recent construction of a light rail line through the same construction zone, but indicated they quickly realized they wish they had understood and known a great deal more.

4.6 RESULTS: HIGHWAY 61, RED WING – CASE 2A

Cost: $13.0 million. The project was led by the City of Red Wing, with some funding from MnDOT.

Timeline: Planning began in September 2013 and construction occurred from April 2015 to August 2016.

Location: Construction occurred along Highway 61 in Red Wing. The 2016 population of Red Wing was 16,450, the household median income was $45,890, residents were 91% white, 2% Black, 2% Native American, 3.7% Hispanic, and 2% two or more races., 22% <18, 18% 65+, 60% 18-65 (https://www.census.gov/quickfacts/fact/table/redwingcityminnesota/PST040216)

Transportation Project Summary: This project included improvements along the south end of Highway 61, enhancing pedestrian safety and other amenities in the downtown business district (pedestrian countdown timers at lights; new medians, sidewalk widenings, treatments, and plantings; bump-outs; and curb cuts), a mill and overlay of Highway 61 through the downtown, a major dig-up and improvement of sewer and water utilities, and improved streetscapes and streetlights to support safety, mobility, and commerce and tourism in the downtown. Construction was extended and timed over two years to minimize impact during high-tourism seasons, since tourism is very important to this small but picturesque town. This project preceded another major improvement that is currently under construction that is related to the Mississippi River Bridge crossing in Red Wing (involving the states of Minnesota and Wisconsin).

High social media use as part of a generally high-effort, multichannel engagement effort: Social media posts related to project planning and construction occurred on four Facebook nodes, three Twitter nodes, and one YouTube node. Seven nodes were official and one was unofficial.

Social media was used to 1) inform people about important construction updates, 2) promote public project meetings, and 3) encourage residents to support local businesses impacted by construction.

Public communication about the project was extensive and accomplished largely through a coordinated effort by The Main Event, a group specially created around the project. Some described the group as a stakeholder advisory group, and others emphasized its role in outreach and engagement about these improvements. The Main Event was led by the director of the Red Wing Area Chamber of Commerce, but also included the director of the local YMCA, the mayor and a councilmember, and representatives of the Downtown Main Street Group, Port Authority, Visitors Convention Bureau, a major manufacturer, and a local hotel. The City of Red Wing - the project planning and management lead - and MnDOT's southeast regional office (District 6) were also extensively involved in public communication. Social media was heavily used to share project information. Weekly YouTube videos provided construction updates and illustrated how to access businesses and other establishments in the downtown. These efforts were oriented both to providing downtown stakeholders with timely updates and to reassuring

and retaining clients and customers to continue to frequent those establishments.

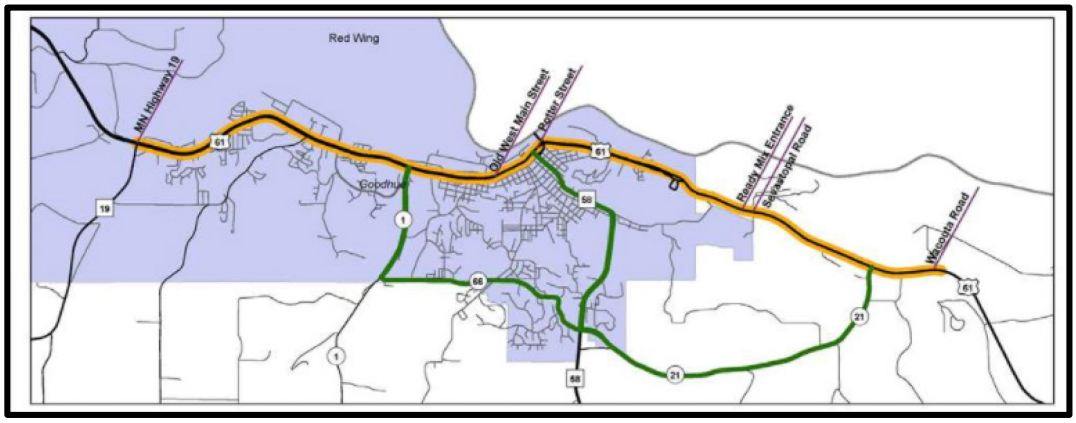


Figure 4.15. Red Wing case area http://www.dot.state.mn.us/d6/projects/hwhy61-red-wing/

Highlights of Social Media Analytics: Highway 61

- Online discussion pertaining to construction along Highway 61 in Red Wing predominately occurred on Facebook and was nearly evenly split between 5 official and unofficial nodes.
- Sentiment analysis of all Highway 61 social media comments indicated that most comments were positive (32%), and negative, balanced, and off-topic comments occurred in similar frequencies (~20%).
- Sentiment was approximately 20% less negative and 30% more off-topic on unofficial nodes than the official social media nodes.

4.6.1 Social Media Analytics: Highway 61

Online discussions pertaining to construction along Highway 61 in Red Wing predominately occurred on Facebook and were nearly evenly split between official and unofficial nodes (Figure 4.16). Most comments occurred on the community-created page Downtown Main Street Red Wing (43 comments) and on the official City of Red Wing Page (37 comments). There were 55 unique users who commented on the various social media nodes. Most users commented only one time and the maximum number of comments from one user was four. Downtown Main Street Red Wing had the highest number of likes (4671 likes, followed by the Red Wing Police Department (4095 likes; Table L2; Appendix L). Facebook Insights revealed information about demographics of City of Red Wing, Red Wing Police Department, and Red Wing Area Chamber of Commerce reach. All platforms reached a similar percentage of women (64%, 69%) and men (31%, 36%). Additionally, age groups were reached at similar levels across nodes.

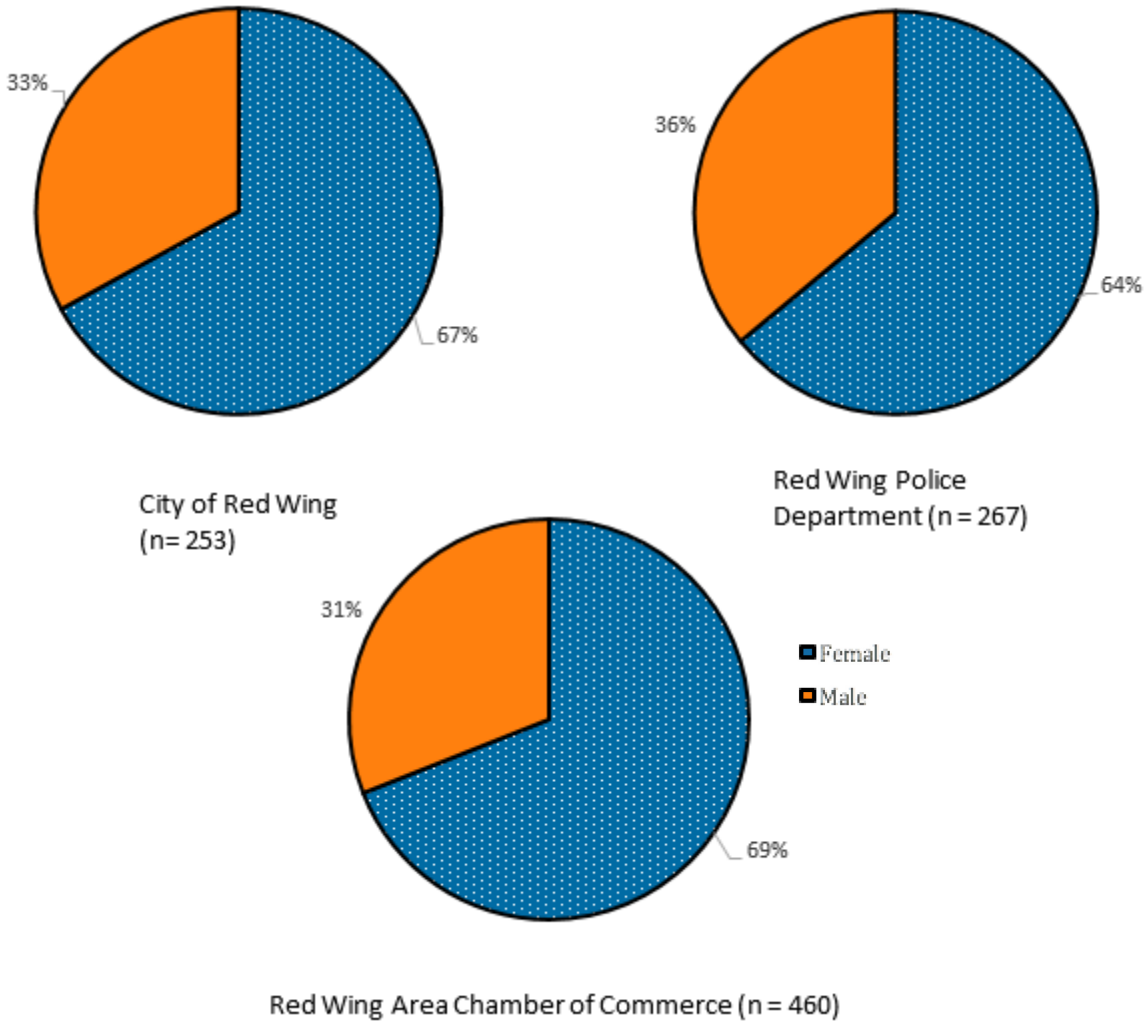


Figure 4.16. Comparison of City of Red Wing, Red Wing Police Department, and Red Wing Area Chamber of Commerce reach by gender.

Red Wing Police Department reached users mostly aged 25-34 and 35-44 (28% and 23% of users reached) while the majority of users reached by Red Wing Area Chamber of Commerce were 25–34 years of age (28%), but those aged 35-44 and 45-54 were reached at similar levels for both males and female (23% and 20% for females; Figure 4.17).

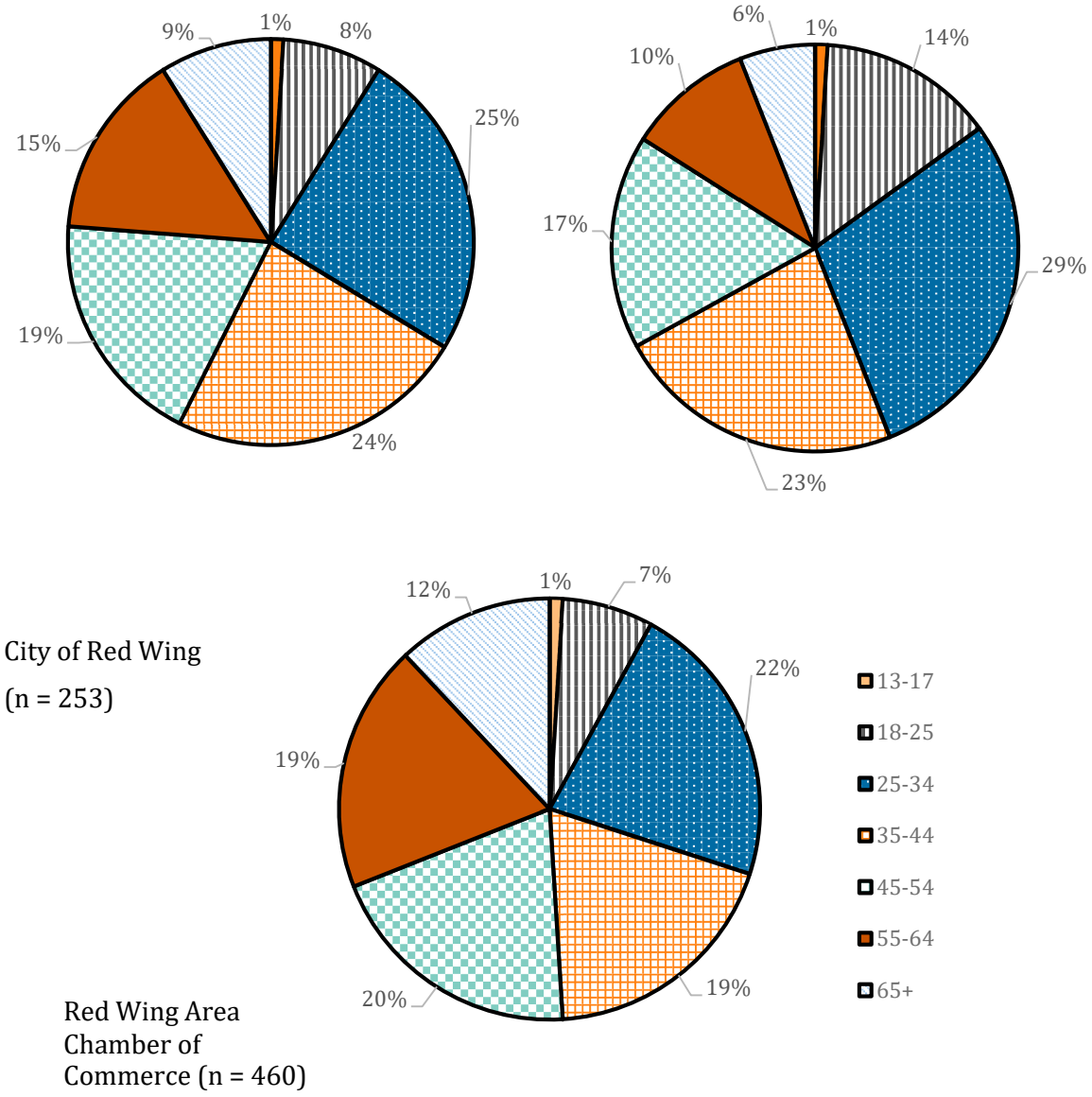


Figure 4.17. City of Red Wing, Red Wing Police Department, and Red Wing Area Chamber of Commerce Facebook reach by age.

City of Red Wing Facebook had an average of 240 impressions, with a standard deviation of 374 and maximum of 1882 starting in May of 2015 through 2016. Red Wing Police Department had an average of 1266 impressions, with a standard deviation of 2070 and a maximum of 14,627. Red Wing Area Chamber of Commerce had an average of 14 impressions, with a standard deviation of 211 and 1090.

There were nine instances of users asking questions via Facebook social media nodes. Four of these questions were answered and all of the answers came from the official page personnel.

The official City of Red Wing, Red Wing Police Department and MnDOT Southeast (District 6) tweeted information related to Highway 61 construction 25 times. Every tweet included a link to another social media channel such as Facebook or YouTube, or a link to the official construction website. There were no replies to these tweets, an average of .13 favorites, and an average of .25 retweets (Table L2; Appendix L). Twitter Audience insights estimate that the majority of Red Wing Police Department's audience has only a high school education, is mostly 25-34 and 35-44, and is 60% male. The City of Red Wing has similar twitter audience estimations.

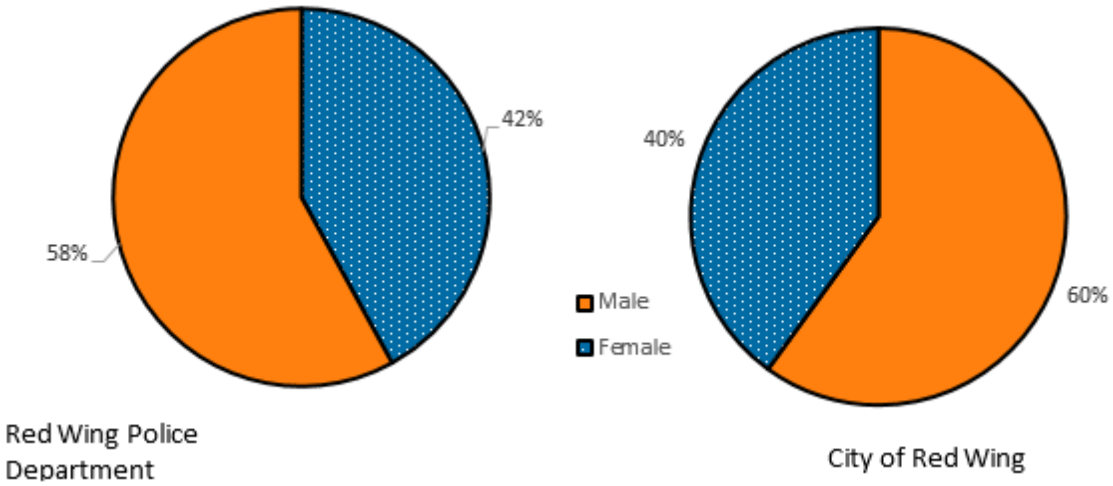


Figure 4.18. Red Wing Police Department Twitter Audience by Gender.

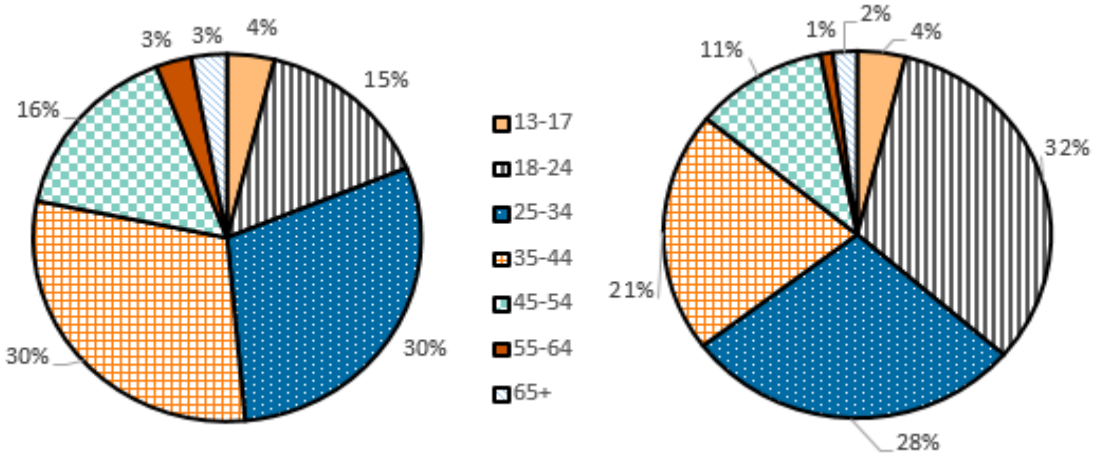


Figure 4.19. Red Wing Police Department vs. City of Red Wing Twitter Audiences by Age Range.

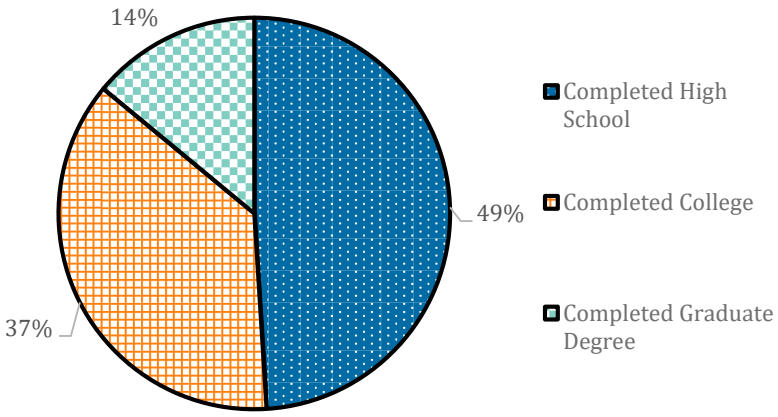


Figure 4.20. Red Wing Police Department Twitter audience by education

The City of Red Wing YouTube page uploaded 45 videos related to Highway 61 construction. Videos had an average of 67 views, .15 likes, and there was only a single comment (Table L5; Appendix L). There were no identified blog posts or forum posts specifically related to Highway 61 construction in Red Wing.

The totality of posts, comments, and questions indicate that social media was mostly used to inform users about Highway 61 planning and construction. However, deeper participation such as consulting or involving may have resulted from Red Wing official nodes sharing information about when their planning meetings occur and how to get involved.

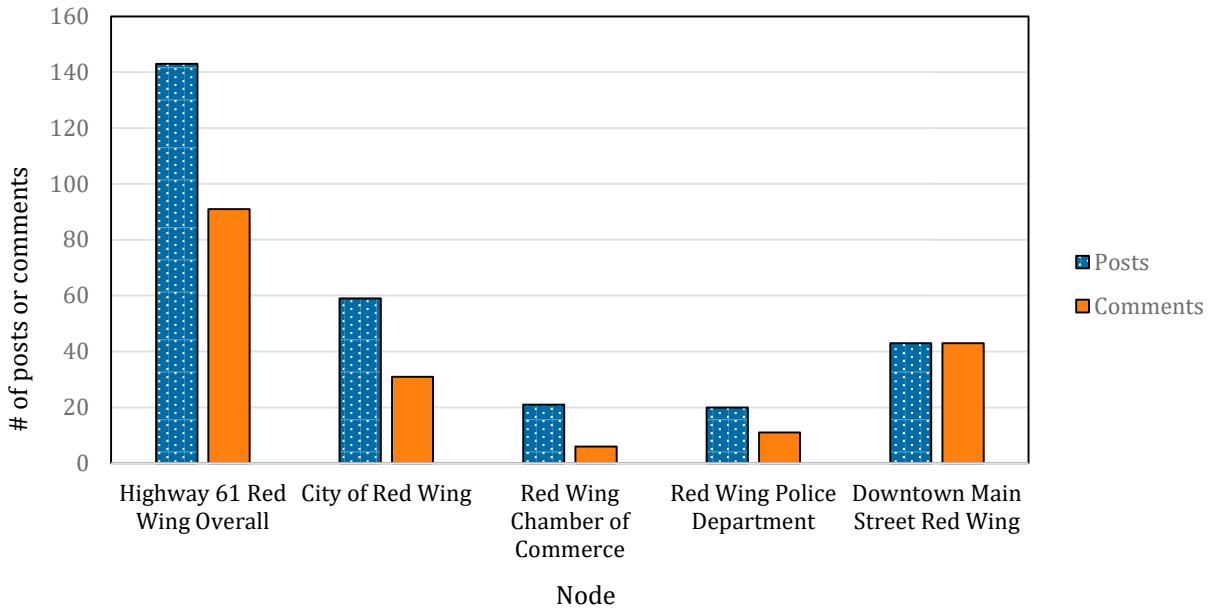


Figure 4.21. Number of Facebook posts and comments relating to Highway 61 construction in Red Wing by node.

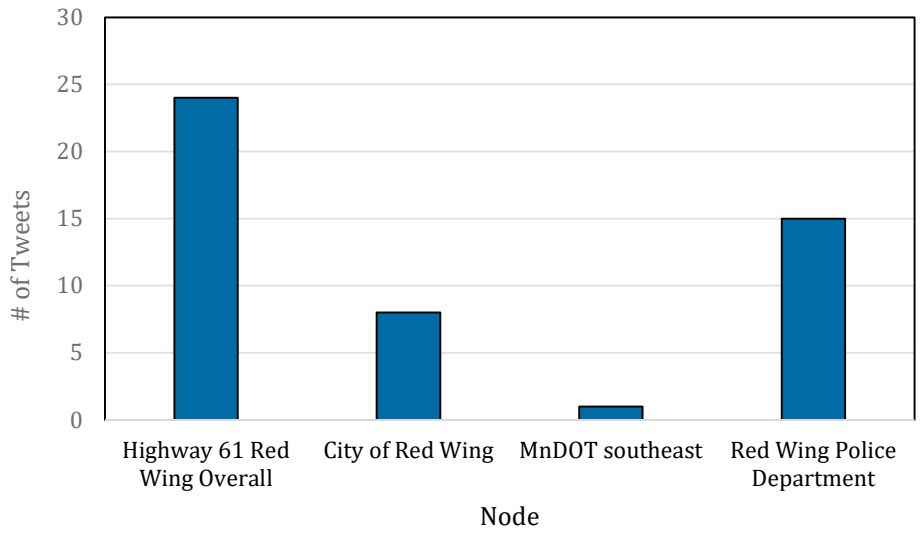


Figure 4.22. Number of tweets related to Highway 61 construction in Red Wing by node.

Sentiment analysis of all Highway 61 social media comments indicated that most comments were positive (32%), with negative, balanced, and off-topic comments occurring in similar frequencies (~20%). Very few comments were balanced (Figure 44). Comparing the official and unofficial social media nodes, sentiment was approximately 20% less negative and 30% more off-topic on unofficial nodes than the official social media nodes.

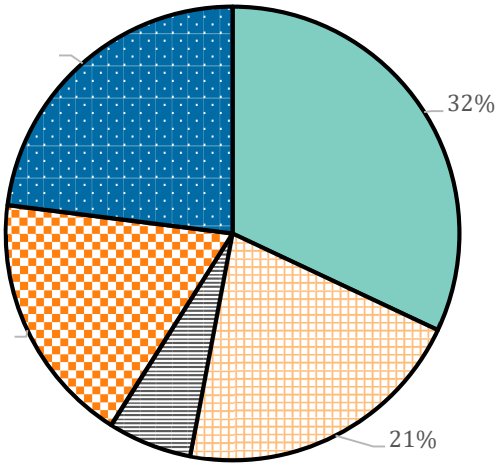


Figure 4.23. Sentiment analysis of all Red Wing social media node content related to Highway 61 construction. (n=82).

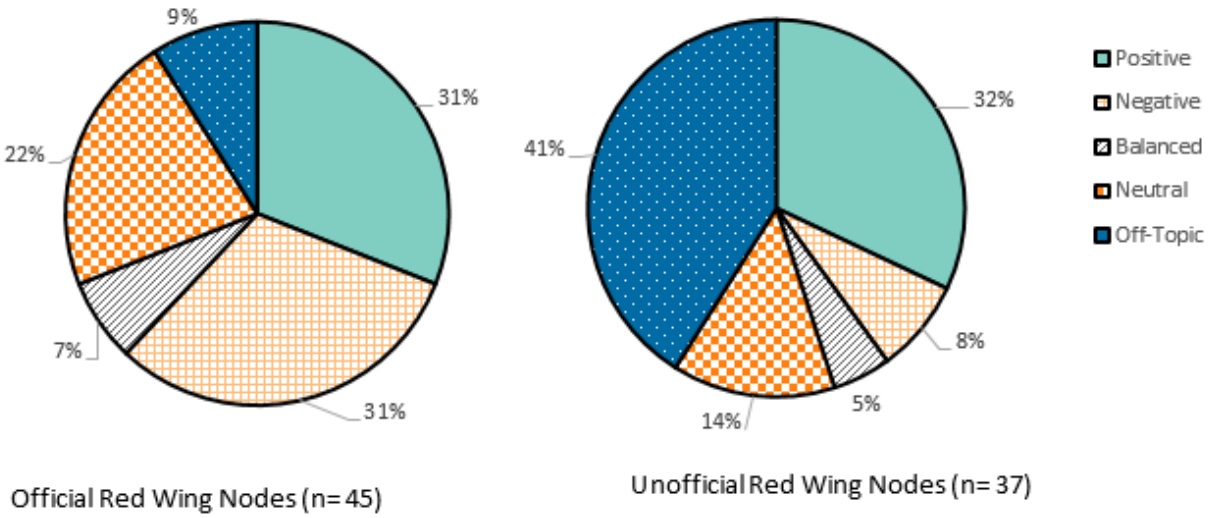


Figure 4.24. Comparison of sentiment analysis of Red Wing official and unofficial social media node content related to Highway 61 construction.

4.6.2 Interview Findings: Highway 61 in Red Wing

The researchers conducted interviews with nine individuals, including five men and four women. Again, as discussed in the description of research methodology, this is not a representative sample. The research team tried to maximize diversity among study participants in order to approximate the full breadth of perspectives. This is important for learning; including people whose judgment of a project or perspectives are unusual can be useful for promoting reflective practice and growth. The study participants for this case comprised three project planning, engineering, and outreach specialists from the involved government agencies, and individuals from an interest group oriented to active transportation, the local chamber of commerce, and the managers or owners of four significantly affected sites (major employer, tourism-oriented business, small business, and community center). As mentioned in the discussion of overall research methods for these four mini case studies, the small number of interviews - especially for a setting with such diverse stakeholders and points of view - cannot be considered to represent all views comprehensively or proportionally. Because the emphasis in this study is to help advance understandings of the promise and pitfalls of these emerging technologies for engagement, the study was specifically designed to gain as diverse a range of perspectives as possible, to illuminate nuances in reactions to social media from different points of view.

There were many positive, actionable lessons to be learned from this case study. In particular, the following themes emerged strongly and consistently from the interviews:

Social media was particularly effective during the construction phase as a way to provide regular updates, stay positive, and encourage people to continue frequenting the downtown. The Main Event group had consulted with numerous other cities across the U.S. about the lessons to be learned about what did and did not work well to support downtown areas through major construction. One of the things they learned was that it was important to continue providing weekly updates, even if there was nothing new or special to report. The stakeholders interviewed frequently made this point, and provided

numerous examples of efforts to keep refreshing content - what one described as "*a regular diet of information*," even if it was "*just small changes*" or a reassurance that "*Here's the progress we made. Here's the progress we hope to make this week*."

Social media became more important as construction picked up. One of the core Main Event members observed, when asked how effective social media was in comparison with other, more traditional methods:

> *During the planning process, we probably got less engagement through social media than through the big, open house-type of meetings. But during construction, this was one of those projects where north side was done, and then the south side, and things would be changing constantly about what the access routes were (laughs). There was a lot of information to funnel back and forth. And for that, more direct email and Facebook kinds of things were even handier to get the word out as things were happening and people were impacted, and more heavily used at that point.*

The City of Red Wing used Youtube to live broadcast weekly public meetings where the city project lead and the contractor shared updates, and where the pubic could provide feedback, share concerns, ask questions, and get direct answers. The leader of The Main Event would also share feedback or present questions from her latest weekly "*walking meeting*" with establishments in the affected area. Although not many people came to the meetings, people involved in the process were surprised by how many people - especially key stakeholders who could not leave their place of work for meetings -- used the broadcasts to follow. As one said,

> *I couldn't believe how many people would tell me later that they popped the broadcast on at work to see what was happening, or would watch it later on Youtube to get an update.*

The variety of types of social media - Facebook postings, tweets, and Youtube videos - supported keeping things fresh and positive, which was consistent with communication priorities to keep stakeholders informed and to keep people coming to the downtown. They used social media to promote "Hard Hat Thursday" specials to encourage customers to come for lunch, or "Find Elvis" treasure hunts to get people into stores for special discounts. As one summarized,

> *Essentially, the whole idea of our outreach was to get people thinking, 'Oh, hey! I should go downtown. I'll walk around to get my special' and then I'll see, "Wow! I could park my car and I could walk!" you know, kind of seeing is believing…*

Indeed, several interviewers were very specific that they went beyond "*nuts and bolts road closure updates*" to "*have a lot fun*" with social media. They sought opportunities to use social media to "*point out things that were cool and unique*." For example, they took advantage of the fact that "*people love looking at machinery*" to show footage of unusual equipment being used to make progress on the construction, and used gimmicky, silly photos from the "Find Elvis!" game to "*help lighten the view of the project so it's not all just, 'Oh, boy. Well, now what?'"* construction updates. Others used social media for education, for example to demonstrate how a new pedestrian crossing signal worked.

Using social media to extensively share content, repackage and rebroadcast it was desirable, not a problem, and in fact was very intentionally coordinated in this case. As one of the government project leaders explained, "*People might get the same information twice [from our list and from the Main Event's list], but they got it*." A manager from a major activity center downtown explained the deliberate strategy of amplifying others' information:

> *The combination of the website and the newspaper and social media pretty much spread the word fast about everything. We made an agreement, all the entities that were involved in The Main Event, that we would share and link all that information on our websites and on our Facebook stuff. So you ended up with a very rapid dissemination ability. The head of the committee would send us an update, and we'd zap it on all of our stuff and really, in a half an hour, all of your local media feeds would have it.*

Government agencies were part of a reciprocal relationship of information sharing. For example, when they had large community meetings, they felt "*helped out by some of these other organizations like the Chamber and Downtown Main Street and the YMCA and so forth*" to publicize those opportunities to gain information and provide input. In turn, MnDOT staff recognized that it was part of their job and that their agency had capacity to generate news releases and technical content, which smaller local governments often do not. Therefore, they often started the construction update spread by creating the initial news releases and encouraged others to "*repackage or re-twee*t."

Study participants repeatedly expressed their belief that abundant communication had been key to the downtown weathering the construction disruptions without much long-term detriment to their businesses, good humor and cohesion. Even considering the fact that residents had many reasons to be pleased with the final project outcomes, they were remarkably positive about the construction process itself. The manager of a major center of activity downtown contrasted this positively with another construction project - which was actually far less impactful and disruptive on the outskirts of town - that was happening simultaneously, yet roused a great deal of anger from residents because they felt left in the dark. In contrast, as a member of the downtown project, this individual asserted:

> *And on this end of town, there was real disruption, huge disruption. And, you know, because we had a phone number and a website and stuff, you know, there was almost no complaints. We did a crazy amount of PR and had almost no comments. Almost no negatives. And of the comments that we got, a lot of them were, 'Oh, this is tough. We're all in this together. We'll get through it and the roads will be way better.' So it was striking, the difference.*

The core stakeholder group was satisfied with using social media strictly in the "inform" mode of the IAP2 Spectrum of Public Participation, without an effort to engage more in "consultation" or dialogue through social media. Despite all of the discussion and enthusiasm for social media, not one of the people interviewed described using or wanting to see it used as a way to ask or answer questions, debate, or state or address complaints. Furthermore, they mentioned no concerns about incivility or misinformation. This response from a leader from the Main Event group, asked by the research team about whether people used Facebook or other social media to ask questions, was typical:

> *Truthfully, there wasn't a whole lot of questions. It was more comments… like about [a building that was torn down] where people would comment 'I used to work there,' or... 'Sad to see it go.' But as far as the project, as a whole, no. I mean, we didn't get people going, [in ornery voice] 'I can't believe you're not…,' or that kind of pushback. That kind of traffic we didn't see.*

Personal, timely responses from key project staff were especially valuable, but providing multiple ways to get information was desirable and necessary. Perhaps one of the reasons that social media was not used to debate and dialogue is because this is a small town, and on-the-ground outreach and personal relationships were strong. There were lots of other opportunities for engagement, including many in which stakeholders and key decisions were engaged in ongoing, active dialogue that was clearly in the more influential, "consultative" range of the IAP2 Spectrum of Public Participation.

Notably, the Main Event group met weekly for two years. Members of that group, when asked the best methods for reaching people, unhesitatingly indicated "*Obviously, face-to-face was by far the best. And that took an incredible amount of time*," but listed that as just the first and best option among a half-dozen channels - newsletters, a website, social media, radio and newspaper outreach - that they used. Interviewees with diverse points of view - from community organizations, tourism-oriented businesses, and government agencies - all emphasized that collectively they had offered a "*menu of ways that you could choose to look at the information however you want, whenever you wan*t" and judged that what had worked well was "*the combination of several methods…. because not everybody gets their news from one outlet.*"

That said, every one of the stakeholders interviewed whose establishment was highly impacted by being right in the construction zone - a small business, a major employer, a community activity center, and an important tourist destination - spontaneously mentioned how important it was that, when a problem arose, they could immediately reach the city's project manager by phone and get a good response. These two quotations encapsulate what many study participants said:

> *It was very well thought through. They told us when they were going to shut off [utilities] and they stuck to their timelines. They were very informative. When we had a problem, when an issue arose and we didn't know if it was a problem or not, they came and adjusted things right away - very speedy*.
>
> *[The city staff lead] was so available. You could find him on the site anytime. You know, you would just go outside and say, 'Hey, did you see that? Can we change that signage?' And within 24 hours, it would be done. Everybody had his cell phone number.*

While study participants who run small businesses emphasized how valuable social media was as a way to stay in touch when they could not easily attend meetings, another stakeholder who does a lot of community organizing observed how important it was to fill in around social media with other ways to reach people:

> *We have a very large percentage of the population that definitely aren't on Twitter but they're not on Facebook, either. You just can't rely on one method of communication at all… Our main piece of this project was to talk to people who wouldn't have found out what was happening, because they weren't online. So we went, personally, to them and then tried to bring their voices to city council.*

Early, extensive outreach reduced anxiety. Above, it was noted that social media outreach was especially valued during the construction period, to provide frequent updates and timely information. The value of thoughtful stakeholder engagement in prior stages of the project should not be overlooked. This was a much slower process of relationship-building, identifying concerns, and planning the project together with a group of stakeholders. After hearing from other cities about the severe impacts that big construction projects could have on downtowns, the Chamber of Commerce, downtown business association, and city government of Red Wing realized that they needed to make a concerted effort, "*well ahead of time*" to come up with strategies. As several interviewees stated, they noticed from the other cities that "C*ommunication was the thing that kept coming up*," and that "*letting people know, well ahead of the project, would help a lot.*" So, they created the Main Event group to "*prepare the business community for the project.*" Indeed, that preparation seems to have reduced anxiety and may also have contributed to a stakeholders' accepting that the project was necessary and indeed desirable. Asked if she had received information about the project, one business owner responded effusively:

Oh, yes, yes. A lot of information…. I was extremely aware of what was happening and the communication was so helpful… [I got involved] as a business owner, because we have to go forward with the project. We have to do it. So, how could we communicate and limit the effect that it has on the businesses and the people living in Red Wing?

People of color and indigenous communities seem to be poorly connected. This is one of the negative aspects of the project outreach revealed through the interviews. All except one study participant described little or no direct experience living in or connecting with these communities, although 8% of Red Wing residents identify as Latino/a, black, or native. This is not to presume that particular outreach and engagement efforts would necessarily be needed, and the disconnect with these communities implies there are significant gaps in outreach.

The people leading engagement efforts for this project appreciated and cultivated positive connections between this construction project and others. Study participants with diverse points of view - including government officials, nonprofit organization managers, and business people - recognized and sought to strengthen ties between this project and the forthcoming major reconstruction of the bridge over the Mississippi River. In fact, they began the Highway 61 improvements through the downtown in anticipation of that upcoming project, seeing one as an opportunity to enhance the other. Two government staff who will equally or even more involved in the bridge project than the downtown improvements recognized that their collaboration with other stakeholders on this project created personal relationships and expanded their networks, facilitated learning about how to do outreach effectively in this community, and built public engagement capacities for the upcoming project. The manager of a downtown establishment confirmed that they had built sustained personal relationships, and furthermore that the Main Event as a group would be rolling forward in some way.

We agreed to keep the Main Event group alive. We're still in touch because there's a bridge project going on in town right now and we're afraid it's going to have that same kind of bad effect. We were really involved and had influence in this project. You can tell when it's just a token thing. Through this process, I have a tight relationship with [the city staff lead]. I know he will not lie to me. You know, I can be cynical about other government types but he tells the truth and if I've got an issue, I call him. So, you work together like that and you build good relationships…

4.7 RESULTS: HIGHWAY 10/59, DETROIT LAKES – CASE 2B

Cost: $14.3 million

Timeline: Planning began in April 2013 and construction occurred from May 2015 - July 2016.
Location: Construction took place in Detroit Lakes. As of 2016 the population was 9165, 22% <18 years of age, 22% were 65 years or older, and 56% were between 18 and 65. Approximately 90% of town residents were white, .7% were black, and 4.4% were American Indian, 1.6% Hispanic, and 3% were two or more races (U.S. Census, 2016).

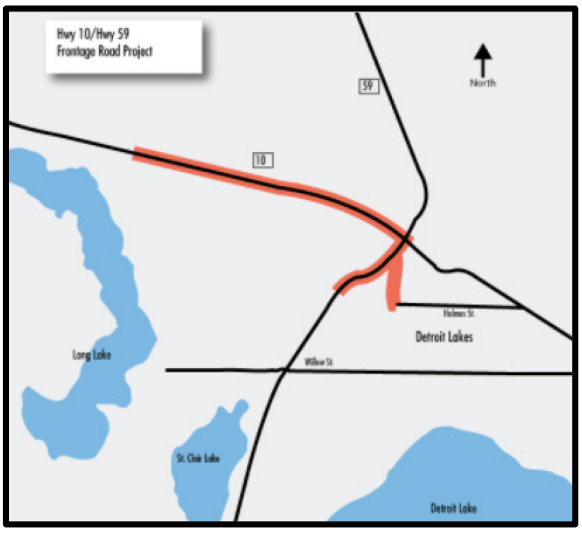


Figure 4.25. Detroit Lakes case area (http://www.dot.state.mn.us/d4/projects/dlfrontag

Project Summary: This project was focused on improving safety on the highways and connectivity of the road network to and from the highways and surface streets. It follows major infrastructure investments in the downtown, which the same MnDOT staff began working with the community to implement in 2006. The 2015-16 Highway 10/59 changes - the focus of this study - were to the west of downtown, and improved access to a set of "big box" regional shopping destinations as well as a regional airport, which is set to expand in 2018. The construction consisted of resurfacing Highway 10 and Highway 59, reconstructing a frontage road system near and along Highway 59, and extending a city street to connect with the new frontage road and building an underpass under Highway 59 to allow people to come from town - on foot, on bike, or by car - to the shopping center.

Low social media use supplemented traditional engagement efforts focused on building relationships. Social media engagement was identified on two Facebook nodes and one Twitter node, all of which were official government social media nodes.

Social media was *not* heavily used, but was used to 1) quickly provide information about construction updates and 2) encourage users to attend public project meetings. Public communication and engagement about the project used primarily traditional engagement methods, including community meetings, going out to do informational presentations with interested groups, and in-person visits to affected stakeholders, and coordination with the local news outlets. There was also a dedicated website for the project. The MnDOT regional office (District 4) began sending out weekly email updates to a list with approximately 1,000 subscribers as soon as construction began.

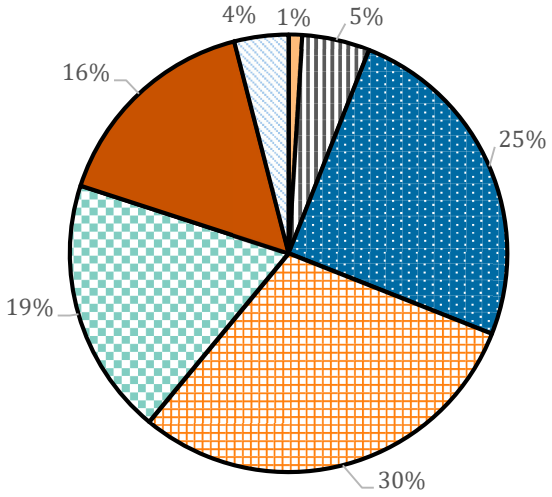
Highlights of Social Media Analytics: Detroit Lakes

- Online discussions pertaining to construction along Highway 10/59 in Detroit Lakes predominately occurred on Facebook. 95% of Facebook comments came from a single node, Visit Detroit Lakes.
- Detroit Lakes Regional Chamber of Commerce Facebook reached 20% more women than men, while Visit Detroit Lakes reached both women and men equally. Visit Detroit Lakes reached 12% more users 65+ than Detroit Lakes Regional Chamber of Commerce, but all other age groups were reached at similar levels. Social media was used to inform, but not involve.
- Detroit Lakes had the highest amount of average comments per Facebook post across all cases, almost five per post.

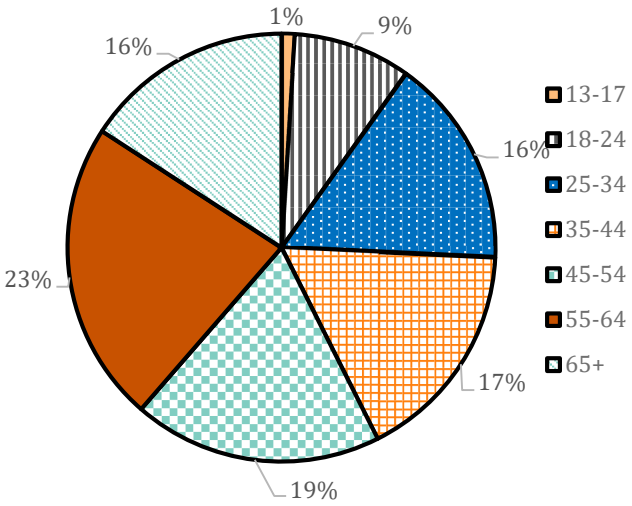
4.7.1 Social Media Analytics: Highway 10/59 in Detroit Lakes

Online discussions pertaining to construction along Highway 10/59 in Detroit Lakes predominately occurred on Facebook. Nearly all, 95%, of Facebook comments came from a single node: Visit Detroit Lakes.

Visit Detroit Lakes Facebook page had 19,504 likes and Detroit Lakes Regional Chamber of Commerce had 993. Detroit Lakes Regional Chamber of commerce had a maximum of 1021 impressions, an average of 138, and a standard deviation of 173. Visit Detroit Lakes had a maximum of 8938 impressions, an average of 1190, and a standard deviation of 1753 (Table L1, Appendix L). Detroit Lakes Regional Chamber of Commerce Facebook reached 20% more women than men, while Visit Detroit Lakes reached both women and men equally. Visit Detroit Lakes reached 12% more users 65+ than Detroit Lakes Regional Chamber of Commerce, but all other age groups were reached at similar levels (Figure 4.26 and 4.27).

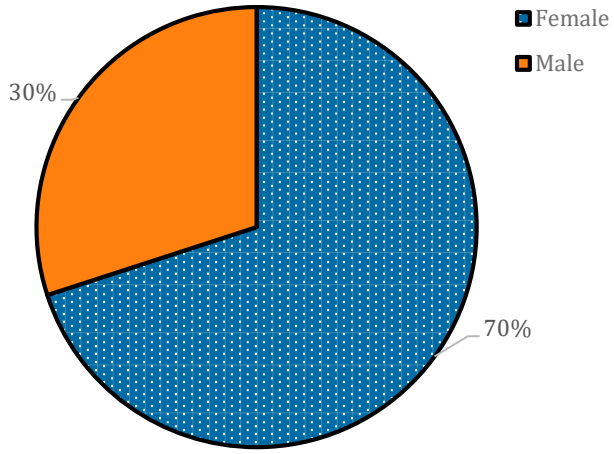


Detroit Lakes Regional Chamber of Commerce (n=154)

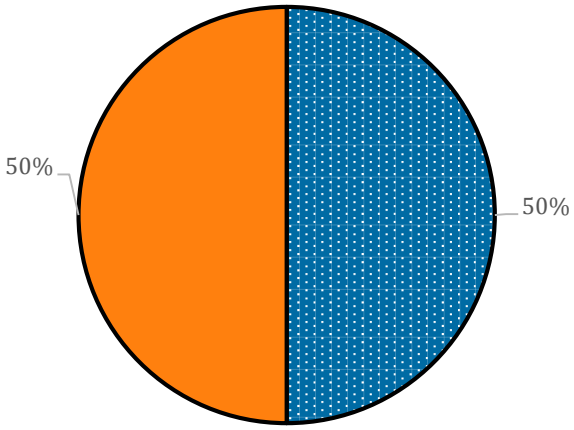


Visit Detroit Lakes (n=126)

Figure 4.26. Comparison between Detroit Lakes Regional Chamber of Commerce and Visit Detroit Lakes Facebook reach by age.



Detroit Lakes Regional Chamber of Commerce (n=154)



Visit Detroit Lakes (n = 126)

Figure 4.27. Comparison between Detroit Lakes Regional Chamber of Commerce and Visit Detroit Lakes Facebook reach by gender.

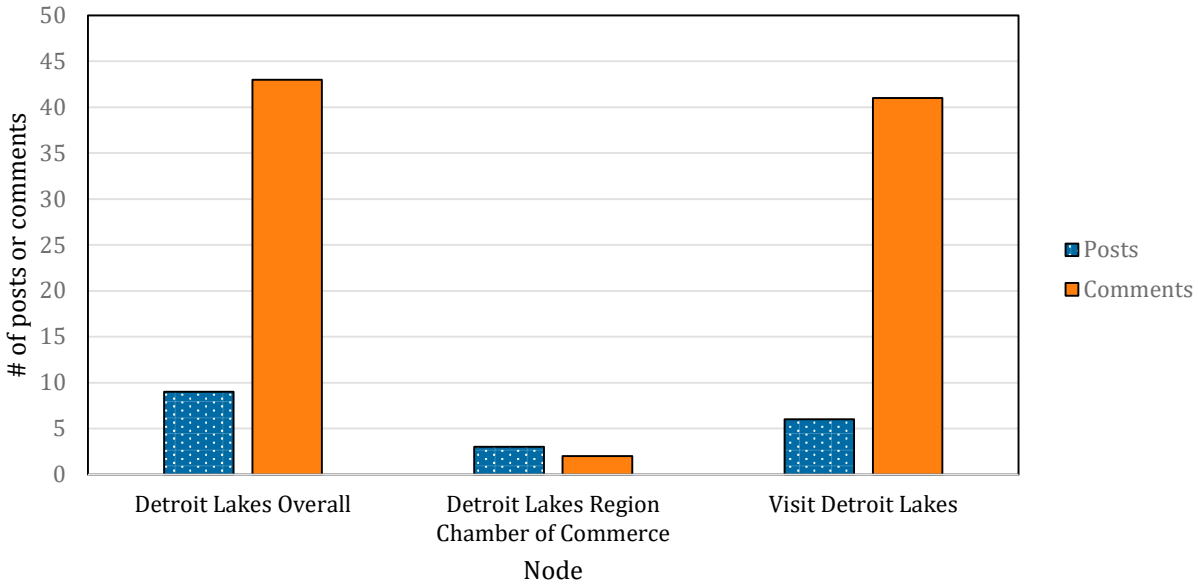


Figure 4.28. Number of Facebook posts and comments relating to Highway 10/59 construction in Detroit Lakes by node.

Sentiment analysis of all Highway 10/59 related social media comments indicated that 37% of comments were positive, 30% were negative, 19% were neutral, 12% were balanced, and 2% were off-topic.

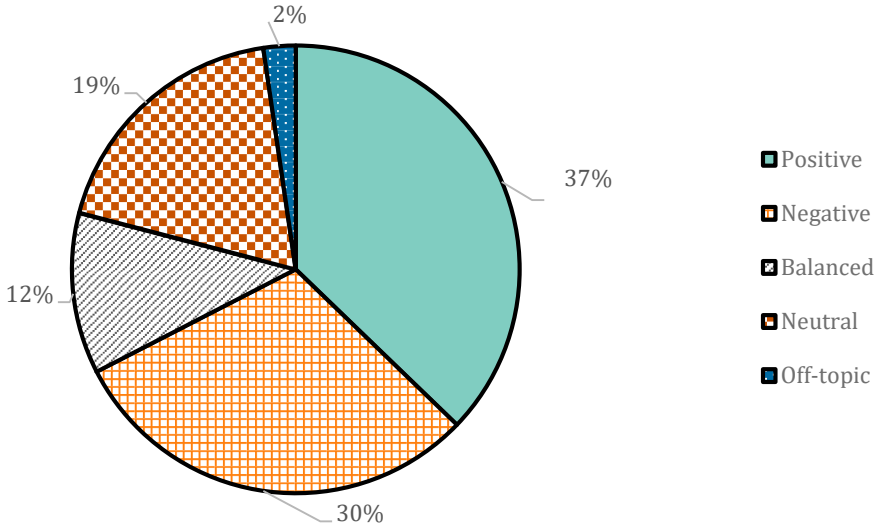


Figure 4.29. Sentiment analysis of Visit Detroit Lakes and Detroit Lakes Regional Chamber of Commerce comments related to Highway 10/59 construction (n = 43).

4.7.2 Interview Findings: Detroit Lakes

The researchers conducted interviews with ten individuals, including six men and four women. Again, as discussed in the description of research methodology, this is not a representative sample. The research team tried to maximize diversity among study participants in order to approximate the full breadth of perspectives. The study participants for this case comprised four government representatives (two project leaders, and elected official / staff of two coordinating jurisdictions) five people whose establishments were impacted by the project (property owners, small businesses, or community service centers), and three interest group representatives (environmental, regional tourism development, or downtown business associations). As mentioned in the discussion of overall research methods for these four mini case studies, the small number of interviews cannot be considered to represent all views comprehensively or proportionally.

The following themes emerged strongly and consistently from the interviews:

There was no strong desire for more social media, which was barely used. The study participants only rarely discussed social media without being asked specifically about it by the research team. Half of the study participants who were not project staff - four of the eight total - were aware that social media was used to communicate about this project, yet seemed to find that uninteresting. Some interviewees could not be sure whether they had or had not seen social media postings, because they received information about the project through so many channels - the weekly email updates, the local newspaper, radio, or television news, a personal visit, or word of mouth -- that any one of them could be redundant and did not stand out. The reaction of the following study participant is fairly typical. He acknowledged a direct question about social media only very summarily before moving immediately on to discuss other outreach methods that were common and, he believed more effective, in this community:

> *We do all that [social media] plus the mailing, like I mentioned, and the newspaper, the radio. Yeah, we've got a good outreach to let people know because, you know, you might get by with not informing the people in a big city, but I'll tell you, the small town – you better get them information otherwise, you're going to find out about it.*

Others were more positive about the opportunities of reaching some members of the public through social media, although they had no interest in it themselves. For example, a small business owner responded, "*Social media seems like a good idea and useful to stay informed. I don't use it a lot, but sometimes it's fun*," and an elected official acknowledged, "*Social media might be good for the younger people. But you get people who are 40 and older, they're not on Facebook and stuff, you know, and Twitter."* In contrast with the assumption just expressed, however, another study participant specifically challenged the conventional wisdom that seniors do not use social media. She suggested that seniors in particular need regular updates, and that social media was an effective way to do it:

> *We are a retirement community. We have many, many, many, many, many senior citizens and they don't like driving in construction. They absolutely hate it. They don't know which lane they're supposed to be in. There are other streets that can get you out there to the grocery store, but if you're not aware of that, you can't use it. I do agree that not all seniors use social media. However, a lot of seniors **do,** because it's a great way to keep up with grandkids and family that live in other parts of the country. And, the ones that do use it meet with ones who don't at coffee shops or wherever and talk about stuff that's going on. So, if there was anything on social media, the chances are pretty good that they would have seen it.*

Very consistently, the stakeholders interviewed expressed a strong preference for using email to receive both regular weekly updates and more urgent messages. They clearly preferred this to having to take the initiative to check the project website for updates. This was true of interest groups:

> *MNDOT posted things on the webpage and maybe now they use social media. I didn't use either much. The website was more for questions from the public, or something that they could check on there, like if there were going to be road closures. I think for [my organization] it was more helpful that we were getting a phone call or a quick email to say, 'Hey, this is what's going on,' or 'If you have any questions, give me a call,' because I don't want to have to go check the website. I'm just going to assume things are going good until they're not. (laughs)*

Owners of small businesses agreed, like this individual:

> *I think they used a website, but I didn't check it. That wouldn't really be something for me, I'm a bit more old-fashioned. I think it is good they put a lot of effort into communicating. It might be good for some people.*

And, even these two communications and public affairs professionals -- who were responsible for keeping their constituents informed – preferred email (among digital methods) or in-person approaches over social media:

> *Personally, I'm a social media person via my workplace. But as much as I love it, it's also kind of ineffective… just because of how Facebook adjusts so that, if you're not liking content, they show you less of that content. So, how would I prefer to get that information? I don't mind getting emails once a week, like a newsletter kind of update. I read the Chamber [of Commerce] email that comes out once a week.*
>
> *I would say generally digital is best. When you have the input meetings, I find those helpful because people in the neighborhood or older folks can come in and ask a lot of questions, and when you see an actual map or a drawing or a big sketch, you can kind of see it better, and some people are more visual than just an email. But I think most of the business community is online in some fashion.*

T***o improve the usefulness of social media, stakeholders recommended using place name hashtags to draw people's attention and monitoring social media to quickly quell misunderstanding***s. Both MnDOT public affairs staff and some other stakeholders perceived limitations in using the MnDOT district office's Twitter account to push project information: because the district covers a 12-county area, it would be counterproductive to fill the messaging with information that would be irrelevant to people living far outside the project zone. For the same reason, one of the stakeholders interviewed suggested using social media, but consistently using hashtags - ***#DetroitLakes*** or ***#DLMN*** - to help users skim for relevant information. Others pointed out that if social media had been used more actively, it would have provided a quick way to detect and address misinformation; as one observed, "*In a community this size, you get rumors and misinformation and questions, and if you could know about them through social media, you could tamp that down*."

Regular email updates is a good method, but stakeholders needed even more frequent updates to stay current. Everyone interviewed accepted and liked the MnDOT district office's decision to communicate primarily via short, regular emails. These responses are typical of how stakeholders responded to a question about whether anything could be improved for future projects:

> *Those emails that come, that's a real nice plus that they've started that. As things are going along, we need to be informed more often of updates.*

Of course, I tried to stay as informed as possible. Anyway, I could better cope with the loss of business hinged on knowing when and what was happening and trying to tell people. Business was bad, really bad...I think I did a good job with advertising sales and communicating how to best get to the store and where to park though.
I'm glad I knew what was going on and we kind of went through it all together. It would have been much more frustrating, also worse for my business, if I didn't have a pretty good sense of where and when the construction was happening.

Another establishment that felt strongly impacted by construction indicated that regular updates allay a lot of frustration and concern about the project, to the extent that it was easier to weather the construction season if they were well informed:

I didn't do much in terms of suggesting how to do the project. It seems like it is MnDOT's forte. They know what they are doing. It all looks nice now. It was a bit of a pain at the time but I think it turned out well and am glad they let us know exactly what was going on.

Several interviewees insisted that updates when there was "**bad news**" or things went "amiss" were especially important. This was valuable to them in two ways: so that they could anticipate and respond to unexpected problems, and so that they could maintain trust in the project team.

The timeline of the project is the most important thing to convey to [my constituents]. Summit Avenue is a main entry to this area from Highway 10. Originally, we were told it'd be [detoured], like, 10 days, and I think we're on week four that it's closed! (laughs) Sometimes the word doesn't get out, but I signed up for MNDOT's updates so you get it as an email. And that might be one thing that they could do better is if there are extended timelines that they hadn't foreseen, they could maybe send an update. People will be still a little disgruntled, but it's nice to know ahead of time, so even if it isn't the news you want, at least you know what's happening.

Stakeholders expressed a strong preference for early communication, particularly so that they could be consulted and have influence over decisions, not simply be informed. Staff of government agencies involved in the project mentioned they shared this view, and wished that communication with stakeholders had begun even earlier

It would probably have been very beneficial to put more of our time and effort on working with stakeholders earlier in the process. It seems like that's when you're getting your best benefit for problems-solving. If you wait too late, it's damage control usually or something.

Stakeholders agreed. Not all had the same experience; some felt they had been consulted early and meaningfully, and during the interviews affirmed how valuable it had been:

They kept me very well informed… However, they could have started communicating a little bit earlier, when I first started to receive info it was obvious they had already been planning things for quite a while.

Other stakeholders - both those happy and unhappy with the overall process and final project outcome - resented not being involved more substantially:

The project is what it is. But I wish that the city council, having approved, would have called some sort of a business owner's meeting and given us a chance to, you know, pin down dates

and stuff. I don't know how much difference it would have made, but we at least would have felt like we were more involved. We could have…we would have had time to rent a billboard or rent a blinking sign of some sort saying, you know, 'We are open. Come in.'
People had talked about construction, but I never heard any actually hard and fast details until it started and cones and stuff started going up. Construction is bad for business because people aren't driving around like they usually do. I feel like if I knew the timeline of things earlier, maybe I could have tried to communicate better with my customers.

As the preceding quotes indicate, stakeholders especially craved more information and guidance - for both residents and visitors - about how to navigate around town during construction. They felt that without that information the public was disoriented, anxious, unable to navigate the week-by-week changes in lanes and detours, and likely to avoid the area. They wanted more communication and better public signs and market to keep visitors coming off the highways into the community and to help residents - particularly older people - to navigate around town.

Having strong relationships is critical to accessing information and sustaining trust about a planning process and project. Conversely, feeling left out of the "in crowd" impedes information and causes resentment. The stakeholders interviewed found it easy to be informed and get a response to concerns and questions, provided they were already well connected with the project manager and other stakeholders:

I remember, probably the year before, getting an update that it was on the horizon, at the Economic Development Summit. It was awesome… very detailed, left room at the end for questions, also was great about staying afterwards and answering any questions about the impact. I just remember it being very detailed like things like explaining why it was going to take so long in relationship with dealing with the concrete and the traffic flow., I remember feeling very informed, which I can't always say from those big meetings, to be honest with you.
I felt very well informed during both before and during construction. I had a good relationship with the project staff, I felt I could always call them if I needed information and they would answer right away. The construction workers were locals and always friendly. I could stop and ask them questions and they would be happy to answer. I attended meetings when I was able, but if I wasn't able to, I felt comfortable contacting the project staff or just talking to fellow businesses in the town who I can count on to share the information.
Many of us are involved in different community organizations, so we were well aware. I can't remember how I first heard about the project, whether it was the city telling us or whether it was a service club that was talking about it or whether it was signs being posted or… I'm assuming we received a letter about the upcoming project, but I can't say for certainty that we did.

A few stakeholders also recognized - some having learned the hard way - that people who were not connected might be left out of the loop:

I don't think the general public have relationships where they can just email or contact them directly, but we've found that the MNDOT people here are easy to work with and willing to help if you have a question or want help.
I like it that you [the researcher] came by to talk with me. Talking to each other is best. I wish the project people had done that with me. They did it with other people, but I have a very small business and so I wasn't considered the way some others were.

Many stakeholders had built strong relationships and trust with the project managers based on a long and positive history of working together. The same MnDOT staff had been involved in projects in Detroit Lakes since at least 2006, and multiple stakeholders described a pattern of the MnDOT office

consistently being proactive and inclusive about discussing issues during design and about responding to concerns as they arose.

> *This project has been a decade in the works with the various phases that they've been doing. I have nothing but accolades for what they've been doing. They always hold annual meetings with all of the other governments, to explain their current year, plus in addition to their five-year plan – so we know if there's road projects that they're anticipating, looking at. And then they always ask us, 'What concerns do you have?' and you name it, they take care of it…. They always, always set up meetings with us to talk about projects and it wasn't after it was designed. It was pre-design phase.*
>
> *I always felt that the MnDOT engineering staff and support staff, overall, have been very good listeners. They listen to our ideas, we've listened to their ideas, and we seem to be able to come up with a plan that's suitable for everyone.*
>
> *It would have been a different development process had the MnDOT team not already done as much downtown **in** Detroit Lakes. This was the same players, the same people, used the same concepts in how MnDOT approached the design with the city. They already had the relationships built and so they didn't have to worry about telling people, 'This is who we are. This is why we're here. We're the professionals. This is why we're the people that need to be doing this and we need to get to know you and what your problems are and your issues.' And you didn't have to do that incoherent, gear-grinding to start with. It was just, 'Hey, we're back again!' (laughs)*

There seems to be a striking absence of connection with people of color and indigenous communities. Even when asked specifically about what practices people used or would like to try to reach non-White communities, most interviewees had nothing or very little to say. While it is true that the vast majority of Detroit Lakes residents - 90% - identify as White, it is also true that 10% do not, and one in 25 residents identifies as Native. Individual study participants did mention positive and thoughtful interactions with individual residents, business owners, and other stakeholders who are immigrants, indigenous, or people of color. However, there seems to be an absence rather than a presence - and a lack of curiosity rather than an interest about how to strengthen - strategies, networks, and relationships for including these stakeholders in planning and communicating about projects.

4.8 DISCUSSION OF CASE STUDY RESULTS

A combination of social media analytics and interviews of people involved with paired-case transportation projects in Minnesota revealed the roles and opportunities related to social media in public engagement. From the analytic and interview data, a pattern emerged of social media use primarily on the inform end of the IAP2 Spectrum of Public Participation. Stakeholders expressed interest in utilizing social media as a tool for moving the engagement effort along this spectrum towards more collaboration and greater stakeholder inclusion in framing problems, identifying opportunities, and deciding how to pursue them. They were interested in using social media as part of an integrated engagement strategy and especially its potential to target some demographic groups for whom social media is a particularly effective channel.

4.8.1 Social media analytics: Does social media increase engagement?

Analysis of social media analytics indicated projects with higher social media use did, indeed, have more connection with users. Interviews shed additional insight as to the effectiveness and quality of this engagement, reported in the later section.

Analytics and interviews alike reveal government social media, across cases, served primarily to inform its audience. The use of social media to inform publics is to be expected. The opportunity to quickly and consistently inform constituents through social media presents an affordable option for stretched government budgets and personnel. While informing stakeholders serves a purpose, higher levels of participation are available to public planners through social media.

Community pages inform and engage Just as government transportation organizations need to partner and attend partner meetings, they need to attend to online community activities. Certainly, monitoring community social media platform pages is in order and ideas for collaboration between government social media nodes and community pages seems reasonable. Community-created pages had some of the highest comment density for each case, such as the Richfield Community Page or the Downtown Main Street Red Wing page. Community-created pages may be less intimidating and more informal than official pages and thus foster dialogue from more users. Similar to meeting people where they are when conducting traditional methods of public engagement, public planning practitioners could possibly benefit from visiting community-created social media nodes to meet the online conversation where it is. The lack of an official presence on some projects may be a crucial component as to why discussions are more elaborate in community-created pages and personnel may find it more appropriate to simply observe rather than intrude into the community space. In cases where sentiment analysis was compared between official nodes and unofficial nodes, unofficial nodes consistently had 18% - 30% more off-topic comments. In the case of Red Wing, social media comments were approximately 20% less negative when occurring on off-topic nodes. As such, paying attention to community-created pages may offer public planners a valuable perspective that is distinct from that on their own official project-associated pages.

Social media remains a supplemental channel, not singular strategy, for public engagement processes. Although appealing for its widespread use, social media cannot be the sole selection for public engagement. Rather, in 2017, social media is a supplement and additional tool for engagement processes.

The population differences of the case study communities make comparing descriptive statistics of specific social media metrics directly somewhat inappropriate; it is intuitive that larger communities have more social media nodes with higher engagement associated with them (e.g. St. Paul has MnDOT while Detroit Lakes only has their city government nodes). However, when examining average number of likes, comments, and shares across Facebook nodes it is clear that larger social media nodes do not, in fact, consistently have higher engagement metrics (Table L1, Appendix L). This can be encouraging news for public planners, especially in smaller city and county governments, and a positive signal that their smaller number of followers will not necessarily translate to disproportionately less engaged social media users.

Attention to metrics is important. Multiple sources of marketing research indicate that social media users can be broadly broken down into three categories of users: ‘enthusiasts’ who post a lot (80 – 90% of comments are estimated to come from this category), ‘dabblers’ who post a small amount

(approximately 10% from this) and 'lurkers' virtually only ever read posts but hardly ever comment (Samuel, 2014; Nielsen, 2006). This inequitable distribution of social media comments is a signal to public planning practitioners that, just as those who speak at traditional public meetings are not necessarily representative of the whole community, they can benefit from understanding that opinions expressed on social media nodes only represent a small slice of the social media users, who in turn are only a slice of the whole community. Research indicates that only a small percentage of social media users who read posts, tweets, or watch YouTube videos actually post. This can be observed in the Richfield (Portland Avenue) case, where Facebook users commented an average of 2.6 times across all nodes, however two outlier users commented 46 and 34 times respectively.

Increased engagement is possible through several measures, including use of hashtags and visual stimulus. Use of hashtags can increase attention to and interaction with materials. Use of hashtags to allow users to clearly and easily search for content they want to find can be a helpful method to allow social media users to find the specific information important to them, as all of these social media nodes contained posts pertaining to a variety of topics beyond the given construction case. Several study participants specifically suggested using location-oriented hashtags, such as #DetroitLakes, for social media accounts that cover geographically large areas, to filter the attention of people most interested in a particular, smaller area. Opportunities exist for government agencies to refine their use of hashtags to have clear, simple, and unique hashtags for all of their projects.

For posts and Tweets across all cases and nodes, the variance of impressions are comparably large; standard deviations specifically are consistently at least 60% of average impression values. Controlling for time of day, day of week, and case, posts with videos or photos embedded have between 50% and more than 100% more impressions than purely text posts. This trend of photo and video updates reaching significantly more Facebook users extends across posts is true for Highway 61 construction in Red Wing, Snelling Avenue construction in St. Paul, and Portland Avenue construction in Richfield. As such, government agencies may benefit from using photos or videos to supplement their status updates and posts whenever appropriate and possible.

4.8.2 Stakeholders' perceptions: How does social media impact engagement?

The interview data did ***not*** reveal clear patterns of overall satisfaction or quality of engagement based upon how much project managers used social media. The number of interviews (39) is not sufficiently large to provide such generalizability. More importantly, the study participants conveyed a nuanced picture in which the impacts of the level of social media use could only be interpreted in the context of how social media were used, how social media use was combined with other engagement methods, and features of the transportation project and community stakeholders. Across the four case studies, the following themes consistently emerged.

1) ***Social media is cost-effective, nimble, and a good way to provide timely updates and draw people to other platforms.*** The best reason to use social media is because so many public agencies' constituents do. Users recommended it as cost-effective, a good way to spread and grow a network, and an easy way to push announcements and provide timely updates, for example on routing changes or business access options that may change rapidly during construction. The interviewees who frequently use social media described it as easy to do, implying that the techniques of using social media are not a barrier. What is required is that project managers both develop a habit of being attentive to what should be shared on social media *and* have the content to do so. Generating

content can be a challenge, especially for local governments with small staffs, so MnDOT plays an important role in providing information and creating news releases.

2) ***Social media is one part of the puzzle; utilizing multiple modes of engagement is essential***.
Interviews provided information that was not visible in the social media data analysis about other modes of engagement. For one thing, many people do not use social media; in Saint Paul and Red Wing in particular, stakeholders insisted that the good old local newspaper was the most effective way to gain the full attention of people in the neighborhood, and an indispensable method for reaching people who do not engage online.
In addition, boots-on-the-ground engagement was named as both the most effective and the most resource-intensive way to engage. Both government project managers and stakeholders in all four case study sites emphasized how important it was for project leaders to walk the project zone to meet stakeholders, whether to discuss plans in advance of the project, plan around people's needs, or troubleshoot during construction. Stakeholders with establishments immediately in the project zone mentioned repeatedly how much they valued having a project manager who was easy to reach and responsive to their concerns. (See point #6, below, for important nuances about in-person outreach and building connections with immigrants.)
Conversely, there are stakeholders whom a "boots on the ground" in-person visit, letter to the property, or a direct flyer approach quite literally cannot reach: cyclists who live some distance from the corridor, clients and customers and congregants who travel (or may be discouraged by construction and avoid traveling) to visit establishments in the project area, or commuters and transit riders who pass through. For these individuals, social media, trusted neighborhood newspapers, good websites, and other mass communication systems are even more necessary.

3) ***Where social media is used, stakeholders prefer it when it is dynamic, meaning it is not just used to push information out or as a new channel for the same kinds of traditional outreach that happen through other means.*** Social media dynamism can take two forms. The first is keeping the content fresh and fun, as demonstrated in the Red Wing Case and their model of providing a "regular diet" of updates to keep people informed and reduce uncertainty. Stakeholders identified two important benefits of this approach. First, they emphasized that providing lots of information, preferably early in the planning stages, and very regularly during construction, could significantly reduce anxiety caused by uncertainty. In particular, they had a great desire for information about the status, timing, and logistics of construction while it was in progress. Even the people interviewed in Richfield, which posted weekly Youtube videos on construction, and Red Wing, which had an active network for relaying information through social media, felt that if anything they could have done more.
Study participants who frequently use social media made it clear that the techniques of using social media are not a barrier, and social media is cost-effective, but project managers have to both have the stance / habit / connection to be attentive to what should be shared and have the content for that. Generating content can be a challenge, especially for small governments, so MnDOT plays an important role in providing information and creating news releases.
The second desire for dynamism is that some stakeholders would prefer social media be used in a more ***consultative*** and ***educational***, not so strictly ***informative*** mode. These stakeholders would like to mobilize dialogue through social media, to use Facebook and Twitter to exchange ideas with others and to receive a response from decision-makers when they pose questions, express preferences, or express concerns. This kind of feedback was commonly heard in interviews in the Richfield and Saint Paul settings. A particular advantage of social media is that people can see one another's responses, so it is an opportunity to educate and leave a record to address frequently

asked questions. However, this takes extra effort to monitor, because with social media there is what some study participants described as a "danger" of wild language, misinformation, mis-communication, and escalation of conflict.

4) ***Where stakeholders were unhappy with engagement, they were most often experiencing efforts that were characteristic of the "inform" end of the IAP2 Spectrum of Public Participation, whereas they wanted earlier and greater involvement in decision-making.*** Many people are not satisfied by engagement efforts – regardless of whether it is through social media or other channels – when they are expecting and hoping to influence the outcomes, yet are merely being informed. In all case study sites, the people interviewed knew of stakeholders who learned about the project only at the point that signs were posted that construction would be starting soon. Not surprisingly, it caused them confusion, anger, or fear because they felt they were involved too little and too late to influence a project or to plan ahead to minimize its negative impacts on them.

   Earlier communication is better, especially if affected stakeholders may have some influence over the process at that point. However, these same emotions were expressed by people who had been well aware of the project, yet felt that efforts to "engage" them had been disingenuous, particularly if they felt they had been invited to provide input on a project, and later came to believe that project managers or policy-makers had never really meant to take their input seriously. In the Richfield and Detroit Lakes cases, stakeholders who were outside the technical boundaries of the project, yet still impacted, were particularly unhappy with feeling left out the network of information exchange and unable to influence the project. Regardless of the timing, implying that listening and influence and response can happen, if in fact decisions are made, spoils relationships and trust.

5) ***How a particular project fits in with past and future transportation projects has strong implications for the quality of engagement and trust.*** The tail on previous transportation projects in which people got burned is long. Once people have lost trust because they feel that previous engagement efforts were disingenuous, – particularly if they feel they were involved too little and too late to change a project – the after effects of lost trust and legitimacy are serious and persistent. This probably cannot be avoided, even if you are a different jurisdiction from the sponsor of the previous one in which distrust, cynicism, or a loss of legitimacy accumulated.

   This came up most frequently as a negative in the Snelling Avenue case – where interviewees were deeply suspicious of any engagement efforts because they felt burned by prior efforts or had great fear about the impacts of the transportation infrastructure improvement on them, given past experiences with losing customers due to reduced parking to having homes destroyed for a new freeway. Conversely, in the Red Wing and Detroit Lakes cases, this took a positive form. Participants in the Red Wing Main Event group saw the downtown main street improvements and their cooperation on public engagement as a foundation for building their networks, learning how to do engagement effectively, and building public engagement capacities for an upcoming project, namely a major construction project to improve the bridge over the Mississippi River. In Detroit Lakes case, both the transportation project managers and community stakeholders recognized how their long experience of positive cooperation on prior projects built trust, allowed them to jump into project coordination more quickly, and eased their cooperation; a downside of this, however, was that some stakeholders without that shared history may feel -- and resent feeling – left out of the loop.

6) ***Engagement with immigrants and communities of color is generally poor. Trusted, established liaisons are good connectors and conveners, but they need resources***. One of the outstanding findings from the interview data is an absence – silence –about attention to and effective practices about engaging with immigrant, indigenous, and communities of color. Despite the fact that the research team consistently asked interviewees about whether and how these stakeholders were connected into the project planning and outreach, there were very, very few success stories. Those interview participants who themselves identified with these communities, or had long histories of ally relationships with them – asserted that they had not been contacted or involved, either as an immediately affected stakeholder or to act as a liaison. Many white stakeholders affirmed that they wanted more tools and to become more effective, yet found it difficult to even name key organizations or leaders with whom they could connect. While there are not enough data in this project to reach a strong conclusion, the interviews are enough to reinforce the fact that this needs more thoughtful attention and capacity.

   Importantly, the immigrants and persons of color who were interviewed indicated that effort is ***not*** best focused on transforming government agencies to build their in-house cultural capacity. While these interviewees agreed that this was important, they asserted that it was even more valuable to support and build connections with trusted, established community partners who are part of the community and have relationships with people who have a strong stake in the project. And, those interviewees who commonly do this community engagement work emphasized that this is skilled work, and that to do it effectively, they need resources: recognition and a place at the table as valued partners, funding support to do the work, and plenty of time to prepare their constituents (to avoid the problem with disingenuous participation described in point #4 and not reproduce the trauma of past projects described in point #5, above).

   An example of how this work takes thoughtful attention in each case is a caveat that several participants raised about what is generally considered good practice in public engagement, namely meeting people where they are. When asked about the ideal ways to be contacted and engaged, some immigrant-owned businesses and organizations immediately mentioned an in-person visit from the project manager as their highest preference. Immigrants who work with organizations that specifically serve immigrants cautioned about this approach, however, observing that some of their constituents are uncomfortable with being visited in their space. So, while one important finding of the study is that having boots on the ground is valuable (point #2, above), people of color who were interviewed suggested it was important to consider ***whose*** boots were on the ground. These divergent reactions emphasize that paying attention to “immigrants” or “people of color” cannot be reduced to having a blanket approach. As a community organizer from the Snelling Avenue project, where there is a long history of multiple projects in the same general area, emphasized, the need and outreach strategy for every project, every group, and every business is different.

CHAPTER 5: RECOMMENDATIONS & CONCLUSIONS

These recommendations stem from integrated results across each research study task and are structured to answer the three research questions of 1) what is the status of social media use for public engagement in transportation planning and other related public sector areas across the U.S? 2) What are the potential penetration rates of social media across and within diverse populations in Minnesota including diversity of location, race/ethnicity, socioeconomic status, and age? and 3) what opportunities exist to maximize engagement opportunities with social media across diversity markers?

This study focused on social media, specifically the research questions just stated. However, the case studies examined preferences and perceptions regarding social media as part of a broader context of public engagement practice. Thus, the case study results yield lessons about what is working well (and should be sustained) and opportunities for improvement in other aspects of public engagement. MnDOT, the Local Road Research Board, and other readers should consult Section 4.8 for additional details, but two recommendations stand out. First, the case study data make clear that stakeholders consistently see social media as only one part of public engagement, such that utilizing multiple channels is essential. Second, engagement with immigrants and communities of color is generally poor. Trusted, established liaisons are good connectors and conveners, but they need resources.

5.1 STATUS OF SOCIAL MEDIA USE FOR ENGAGEMENT

Emerging and changing preferences for social media platforms must be continually evaluated. Attention to emerging platforms and multi-platform efforts will be similarly advantageous. Multiple platforms deserve consideration for inclusion in an integrated and strategic social media strategy. Twitter use did not differ across any diversity marker, but due to its overall lower use may not be the most effective if agencies must choose among platforms. Beyond Facebook, Minnesotans use Snapchat two to three times more than is nationally reported (Pew Research Center, 2016c; Pew Research Center, 2016b). While many state transportation agencies are exploring newer platform use such as Instagram, including MnDOT, evaluations of their effectiveness remain absent in the literature. Snapchat use is more limited at the state level (MI and LA only as only 2017) but certainly worthy of attention given the higher use rates among Minnesotans.

Take advantage of different social media platforms for particular engagement purposes. Due to platform capabilities, some social media platforms are better suited for specific activities. As with any public involvement processes, setting clear goals and expectations is important to optimize satisfaction and process understanding (Bryson, Quick, Slotterback, & Crosby 2013; Jaeger, Bertot & Shilton, 2012). For instance, transportation agencies capitalize on Facebook, YouTube, and Twitter's capabilities to easily provide information (Bryer, 2013; Bregman & Watkins, 2014; Transportation Research Board, 2012).

As mentioned, MnDOT found success providing information to, and to some degree consulting with, constituents on Facebook. Many nationwide examples exist of successful e-participation strategies. MnDOT and LRRB may be able to replicate crowdsourcing success on Facebook by asking for similar status updates from Facebook followers regarding ongoing projects. Potentially more complex is Facebook use to involve the public by gathering positive and negative input regarding projects. MnDOT and LRRB could potentially replicate this type of engagement with sufficient staff to respond to citizen ideas and questions, clear codes of conduct to ensure comments are productive, and agency-set expectations regarding how posted ideas and comments will be used.

MnDOT and LRRB both have and use YouTube channels to inform the public, though opportunity still exists to expand this. Dallas Area Rapid Transit (DART) used YouTube to inform for multiple purposes, including YouTube campaigns to build excitement for projects. One campaign featured a weekly YouTube video to build and sustain excitement and interest for a light rail project over an 18-month construction period. The weekly videos put a human face on the project by featuring employees who normally did not work with the public explaining how they were connected to the project. Once the light rail opened, DART continued using YouTube to assist customers with changes due to the project, specifically how to make connections at the new stations (Bregman, 2011). While MnDOT is currently using YouTube in a similar manner, a cohesive strategized campaign surrounding a long-term project or increased YouTube use for specific projects, which are the videos with the most views on MnDOT's YouTube channel, may be advantageous. For example, MnDOT's "Movable Barrier on 1-94 from St Paul to Maplewood" video received 1,363 views as of the beginning of June 2017, compared to their explanation of how to use a roundabout, posted about a month prior to the I-94 video, which received only 336 views. LRRB has used YouTube for informational videos in the past, but regular use of their channel to keep constituents interest, especially for specific projects, would likely be beneficial.

5.2 POTENTIAL SOCIAL MEDIA PENETRATION RATES WITHIN DIVERSE POPULATIONS

The statewide phone survey found clear patterns of preference for different types of social media and other engagement methods by region, age, gender, and racial or ethnic groups. Generally, interest is higher with those who have a greater education, higher income, and are younger than 65. However, when all demographic characteristics were combined into predictive binomial regression models, results indicated interest did not consistently vary across groups. Stakeholders interviewed in every case study made strong assertions about the differentiated needs and preferences they perceived - between younger and older people, people residing or operating establishments in the project zone vs. accessing or transiting through it – about the social media channel, frequency, and content for receiving information. Project managers should consider the demographic features of the stakeholders in their project, compare that with the statewide survey and other resources on communication preferences, and direct their engagement modes and efforts accordingly. To reach stakeholders who are not immediately in the construction zones, social media and traditional mass media (especially trusted local newspapers) may be especially effective.

5.3 OPPORTUNITIES TO IMPROVE SOCIAL MEDIA ENGAGEMENT

Taken as a whole, findings suggest at least four main opportunities to strengthen meaningful social media engagement:

1. ***Integrate social media into multi-pronged, dynamic engagement approaches.*** Social media offers advantages – an expanded reach, multi-media capacities, and low cost – but, as of 2018, can neither stand alone nor wholly substitute for participation mechanisms closer to the collaborative end of the participation framework. Social media is most effective when it is shared and dynamic:
    - ***Shared.*** Pay attention and contribute to community-created social media pages to more effectively share information and leverage community relationships.
    - ***Dynamic***. Content and the timing of that content needs to stay fresh and interesting. Social media needs to provide a "regular diet" of new information and updates for people to stay

engaged. Social media efforts with the greatest engagement also take advantage of the multi-media capacity of social media (for example, weekly video construction updates, polls about project preferences, or crowdsourcing pothole reports).

2. ***Consider the demographic qualities of the key stakeholders to determine how social media can be most useful***. Literature and survey data analysis indicated that stakeholder age, race, and location significantly impact interest in using social media for transportation planning participation. Non-Whites, Metro residents, and those 30 – 49 years of age expressed higher interest in the use of social media for engaging in transportation planning among the Minnesotans surveyed. The age differences mirror other social media platform participation rates where use generally decreased with age. While significantly different, the location difference for social media interest seems unsubstantial. However, in non-Metro counties with significantly aged populations, the prominence of social media in public engagement processes warrants serious consideration. When age, gender, race, income, and education variables are combined into like groups and organized into strata, results from predictive regression models indicate that interest in e-participation does not vary significantly based on one's position in society. Furthermore, case study social media analytics suggest that gender is not strongly associated with engaging with social media related to transportation planning, but those ages 24 – 44 are consistently the most reached by such pages.
3. **Employ best practices for social media management** such as:
    - Using hashtags to organize data and help stakeholders more easily understand and digest information in situations where many different projects may be ongoing simultaneously.
    - Posting dynamic content when possible and appropriate, such as, videos, live streams, and encouraging dialogue and similar video postings by followers.
    - Clearly stating social media guidelines for people who use platforms.
    - Monitoring existing social media metrics readily available on each platform, such as Facebook Insights or Twitter Analytics.
4. Expand and/ or develop **research and evaluation plans** to understand and assess future social media engagement efforts. Reflect on what processes and strategies work well and why for different purposes, compare e-participation strategies to successful examples elsewhere, and pay attention to the constantly shifting and evolving social media landscape.

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APPENDIX A
SEARCH TERMS AND NAMES

Search term combinations used in Google Scholar and MNCAT
Evans-Cowley
Ines Mergel
Clayton Wukich
Nader Afzalan
Social media transportation planning engagement
Social media transportation planning
Planning public engagement social media
Planning public sector social media
Diversity social media use (2012+)
Diverse social media use (2012+)
African American social media use (2012+)
Social media–user statistics (2012+)
Mexican American social media use (2012+)
Hmong American social media
Asian American social media
Twitter user demographics (2013+)
Twitter diversity US
Twitter Social Media African American (2013+)
Twitter Social Media Mexican American
Twitter Social Media Hmong American
Twitter Social Media Asian American
Facebook user demographics (2013+)
Facebook diversity US
Facebook Social Media African American (2013+)
Facebook Social Media Mexican American
Facebook Social Media Asian American
Youtube user demographics (2013+)
Social media use disability
Transportation planning social media African Americans
Transportation planning social media Mexican American
Transportation planning social media Asian American
Transportation planning social media disability
Public sector planning social media disability
Public sector planning social media African Americans
Public sector planning social media Mexican American
Public sector planning social media Asian American
Health planning social media disability
Health planning social media African Americans
Health planning social media Mexican American
Health planning social media Asian American
Land use planning social media disability

Land use planning social media African Americans
Land use planning social media Mexican American
Land use planning social media Asian American
Park planning social media disability
Park planning social media African Americans
Park planning social media Mexican American
Park planning social media Asian American
Social media use MN
Snapchat user demographics
YouTube user demographics (2013+)
Community and non-profit group social media use
Non-profit planning social media use
Forestry planning use social media
Natural resources use social media
Wildlife planning use social media

Completed Searches in Web of Science:
Public sector planning social media (saved for alert)
Social media transportation planning (saved for alert)
Completed Searches in TRANSPORT Database:
Social Media
Planning Social Media
Completed Searches in specific journals/sites/databases…

- Pew Research Center:
  - Internet & Tech -> Social Media (2012+)
  - Internet & Tech -> Demographics (2011+)
- Statistical:
  - Minnesota Internet Use
- eMarketer:
  - Minnesota Internet Use
  - Snapchat Users
- Proquest Statistical Insight:
  - Minnesota Internet Use
- Searched for E-Journals: “Diversity” and “Diverse”
  - “The Diversity Factor” -> Social Media
  - “Diversity” is on biodiversity…
  - “Insight into Diversity” -> Social Media
  - "Journal of Cultural Diversity" -> Social Media
  - “Cultural diversity & ethnic minority psychology” -> Social Media
  - “Diversity digest” -> Social Media
  - “Diversity & Democracy” -> Social Media
  - “Diversity insight” -> Social Media

  - "Journal of Diversity Management" -> Social Media
- Searched for E-Journals: "Social media"
  - "Social Media Sources" -> Planning -> Public Sector
  - "Computer Science, Computer Engineering, and Social Media (CSCESM), Second International Conference on IEEE" -> Planning
  - "Social Media + Society" -> Planning -> Public Sector -> Social Media
- Searched for E-Journals: "Planning"
  - "Planning Practice & Research" ->Social Media
  - "Planning" ->Social Media
  - "Progress in Planning" ->Social Media
  - "Journal of the American Planning Association" ->Social Media
  - "Journal of Urban Planning and Development" ->Social Media
  - "Urban, Planning and Transport Research" ->Social Media

Searched in E-Journal "Government Information Quarterly" ->Social Media planning

APPENDIX B
SELECT MINNESOTA STATE SURVEY QUESTIONS

A. QUALITY OF LIFE

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i) QA2. What county do you live in?
(RECODED INTO GREATER MN/METRO FOR RESULTS)

Freq	(%)		
378	(46)	01.	Greater Minnesota
442	(54)	02.	Twin Cities area

G. TRANSPORTATION PLANNING

The next questions are about participation in public policy processes.

QG1. In the past twelve months, have you participated in a public policy or decision-making process, for example, by providing input on a government program, policy, or project?

Freq	(%)		
176	(22)	1.	Yes
624	(78)	2.	No
4		8.	DK
3		9.	RA

QG2. In the past twelve months, have you participated in a public policy or decision- making process about a TRANSPORTATION program, policy, or project (READ LIST)?

		YES 1	NO 2	DK 8	RA 9	
a.	By attending a community meeting or hearing	85 (11)	720 (89)	0	2	Freq (%)
b.	By completing a survey or being in a focus group	131 (16)	673 (84)	1	1	
c.	By using social media like Facebook or Twitter	124 (15)	680 (85)	2	1	
d.	By providing input through e-mail	152 (19)	653 (81)	0	1	
e.	By contacting a public official	165 (20)	641 (80)	0	1	
f.	By doing something else	85 (10)	717 (90)	2	3	

QG3. Do you EVER use social media, such as Twitter, Facebook, or YouTube?

Freq	(%)			
573	(71)	1.	Yes	
233	(29)	2.	No	(IF NO, GO TO 4)
0		8.	DK	
0		9.	RA	(IF RA, GO TO 4)

QG3a. (IF YES OR DK) I'd like to know how frequently you use each type of social media. How often do you use (READ LIST) . . . daily, every other day, weekly, monthly, less often than that, or never?

			DAILY 1	EVERY OTHER DAY 2	WEEKLY 3	MONTHLY 4	LESS OFTEN 5	NEVER 6	DK 8	RA 9	NA .	
___	a-1.	Twitter	38	18	32	44	36	402	0	2	233	Freq
			(7)	(3)	(6)	(8)	(6)	(70)				(%)
___	a-2.	Pinterest	26	17	62	67	67	330	1	3	233	
			(4)	(3)	(11)	(12)	(12)	(58)				
___	a-3.	Instagram	58	19	51	29	21	390	1	2	233	
			(10)	(3)	(9)	(5)	(4)	(68)				
___	a-4.	Facebook	336	63	79	31	13	48	0	2	233	
			(59)	(11)	(14)	(6)	(2)	(8)				
___	a-5.	Snapchat	66	13	31	18	14	427	1	2	233	
			(12)	(2)	(6)	(3)	(2)	(75)				
___	a-6.	YouTube	124	51	161	107	59	69	0	2	233	
			(22)	(9)	(28)	(19)	(10)	(12)				
	a-7.	Some other social media	40	8	20	8	3	482	9	2	233	
			(7)	(2)	(4)	(2)	(0)	(86)				

(SPECIFY) _____

RANDOM START QG3a: _____

QG4. Please tell me how interested you are in each of the following activities for TRANSPORTATION projects, policies, or programs. (READ LIST) Are you very interested, somewhat interested, not very interested, or not at all interested?

		VERY INT 1	SOME-WHAT INT 2	NOT VERY INT 3	NOT AT ALL INT 4	DK 8	RA 9	
a.	RECEIVING information through social media	65 (8)	229 (29)	207 (26)	301 (38)	3	1	Freq (%)
b.	Providing FEEDBACK through social media	59 (7)	224 (28)	195 (24)	321 (40)	4	3	
c.	Making SUGGESTIONS through social media	71 (9)	208 (26)	177 (22)	345 (43)	2	3	

I. DEMOGRAPHICS (SELECTIVELY PRESENTED FOR THOSE USED)

Before ending this interview, I have a few remaining background questions.

1. THERE IS NO QUESTION 1 IN THIS SECTION

QI2. What is your zip code?

___ ___ ___ ___ ___

88888 DK
99999 RA

QI5. (IF LANDLINE) Do you or any of the other adults in your household have a working cell phone?

1.	Yes	
2.	No	(IF NO, GO TO 6)
8.	DK	(IF DK, GO TO 6)
9.	RA	(IF RA, GO TO 6)
.	NA	

QI5a. (IF YES) Of all the telephone calls that you and the other adults in your household receive, do you get all or almost all calls on a cell phone, some on a cell phone and some on a regular home phone, or all or almost all calls on a regular home phone?

1.	All or almost all calls on a cell phone
2.	Some on a cell phone and some on a regular home phone
3.	All or almost all calls on a regular home phone
8.	DK
9.	RA
.	NA

QI7. What year were you born?

___ ___ ___ ___

8888 DK
9999 RA

QI8. What is the highest level of school you have completed? (DO NOT READ LIST)
(CLARIFY "HIGH SCHOOL" OR "COLLEGE")

Freq	(%)		
4	(0)	01.	Less than high school
12	(2)	02.	Some high school
133	(17)	03.	High school graduate
70	(9)	04.	Some technical school or 2 year community college
128	(16)	05.	Technical school or 2 year community college graduate
83	(10)	06.	Attended a 4 year college but did NOT graduate
212	(27)	07.	College graduate (Bachelor's degree, BA, BS)
24	(3)	08.	Some graduate school or professional school
134	(17)	09.	Post graduate or professional degree (Master's, Doctorate, MS, MA, PhD, Law degree, Medical degree)
0	(-)	10.	Other (SPECIFY) _____
1		88.	DK
7		99.	RA

QI9. What race do you consider yourself?
(DO NOT READ LIST UNLESS NEEDED)

677	(86)	1.	White/Caucasian
8	(1)	2.	Latino/Hispanic
35	(4)	3.	Black/African American
18	(2)	4.	American Indian
22	(3)	5.	Asian or Pacific Islander
8	(1)	6.	No dominant racial identification
17	(2)	7.	Other (SPECIFY) _____
1		8.	DK
21		9.	RA

QI12. Did you have a paying job last week?

1. Yes
2. No
8. DK (IF DK, GO TO 13)
9. RA (IF RA, GO TO 13)

QI12a. (IF YES) Were you working full-time or part-time?

1. Full-time
2. Part-time
8. DK
9. RA
. NA

b. (IF NO) Do you consider yourself retired, unemployed, a student, or a homemaker? (SELECT ALL THAT APPLY)

		YES	NO	DK	RA	NA
QI12b-1.	Retired	1	2	8	9	.
QI12b-2.	Unemployed	1	2	8	9	.
QI12b-3.	A student	1	2	8	9	.
QI12b-4.	A homemaker	1	2	8	9	.
QI12b-5.	Disabled (VOLUNTEERED)	1	2	8	9	.

QI13. Was your total household income in the year 2015 above or below $70,000?

Freq	(%)			
373	(51)	1.	Above	
355	(49)	2.	Below	
16		8.	DK	(IF DK, GO TO 16)
62		9.	RA	(IF RA, GO TO 16)

QI13a. (IF ABOVE) I am going to mention a number of income categories. When I come to the category which describes your total household income BEFORE taxes in the year 2015, please stop me.

60	(17)	1.	70 to 80,000	
51	(14)	2.	80 to 90,000	
40	(11)	3.	90 to 100,000	
45	(13)	4.	100 to 110,000	
41	(12)	5.	110 to 120,000	
24	(7)	6.	120 to 130,000	
91	(26)	7.	130,000 or more	
9		8.	DK	(IF DK, GO TO 16)
13		9.	RA	(IF RA, GO TO 16)
433		.	NA	

QI13b. (IF BELOW) I am going to mention a number of income categories. When I come to the category which describes your total household income BEFORE taxes in the year 2015, please stop me.

24	(7)	1.	Under 10,000	
39	(11)	2.	10 to 20,000	
60	(18)	3.	20 to 30,000	
59	(17)	4.	30 to 40,000	
62	(18)	5.	40 to 50,000	
57	(17)	6.	50 to 60,000	
39	(12)	7.	60 to 70,000	
5		8.	DK	(IF DK, GO TO 16)
10		9.	RA	(IF RA, GO TO 16)
451		.	NA	

QI14. This income figure you just gave me includes the income of everyone who was living in your household in the year 2015. Is that correct?

1.	Yes	
2.	No	(IF NO, REPEAT QUESTION 13)
8.	DK	
9.	RA	
.	NA	

QI15. How many persons in the household contributed earnings or income that was part of the total household income you gave me for the year 2015?

___ ___	persons
88	DK
99	RA
.	NA

QI16. Are you male or female?

Freq	(%)		
396	(49)	1.	Male
410	(51)	2.	Female
0		3.	Other (SPECIFY) _____
0		9.	RA

END. Thank you for answering all these questions. I really appreciate your time. (IF A

(RESPONDENT ASKS FOR SURVEY RESULTS,
HAVE THEM CONTACT ROSSANA ARMSON AT 612-626-4282 DURING
BUSINESS HOURS, 9 AM TO 5 PM.)

APPENDIX C
SUPPLEMENTAL LITERATURE REVIEW DATA TABLES

Table C1. Examples of engagement on social media platforms in transportation sector

Social Media Platform	Description	Engagement Uses in Transportation		
		Inform	Crowdsource	Consult/Involve/Collaborate
Twitter	A "real-time network that lets members share info in very short posts or "tweets". Each tweet is a maximum of 140 characters long (including spaces) and can include links to websites, photographs, and video clips… Users can subscribe to or follow posts from other members and members can share tweets with their followers by forwarding or "retweeting" updates of interest."[2]	District DOT in DC uses Twitter to quickly inform people on need to know information regarding their transportation systems[2 pg. 59]	The Delaware Valley Regional Planning Commission (DVRPC) has used Twitter to receive information about issues from citizens (one example given was a tweet about broken equipment)[16 pg. 101]	Twitter was used by King County Metro to complement and strengthen voices of citizens advocating for a transit policy change[2 pg. 113]
Facebook	A "social networking site that invites users to create profiles, connect with other users, exchange messages, and share links, photos and videos. Users can also set up groups around a particular topic or interest."[2]	Honolulu Rail Transit's Facebook page provided links to project newsletters, news links, traffic updates, and pictures and notes from meetings held, along with other information[4 pg. 103]	Chicago Transit Authority set up a Facebook page allowing subscribers to share updates for their red line stations[2 pg. 157]	CA MTA westbound subway extension, now known as the "Purple Line Extension", had a Facebook page used for more than information exchange. The MTA encouraged assenting and dissenting views on the subway and related projects, was responsive to questions and ideas, and provided equal opportunity to all positions and interests[1]

Table C1. Examples of engagement on social media platforms in transportation sector (cont.)

Video sharing	Such as YouTube. Video hosting sites "on which users can upload, watch and share short videos."[2]	Dallas Area Rapid Transit (DART) used YouTube to inform customers about bus route changes occurring due to opening of its Green Line. For example, some DART videos showing customers how to make connections at the new stations[15 pg. 30]		
Flickr	"…website that allows users to publish and share photographs."[2]	Loop 1604; San Antonio, TX: Flickr photostream included photos of public meetings, citizen advisory group meetings, and existing conditions in the study corridor[4 pg. 104]	Chicago Transit Authority set up a Flickr group allowing subscribers to share updates for their red line stations[2 pg. 157]	
Blogs	"…a regularly updated online journal… can be about any subject and usually contain comments from readers, photographs and media clips, and links to other websites."[2]	LA Metro's blog *The Source* focuses on topics such as Metro planning and construction projects, service updates and feature stories[2 pg. 16]		
Specific engagement software or platform (OpenPlans, Next Stop Design, Urban Mediator, Shareabouts, etc.)	Allow the public to contribute knowledge and expertise through discussion with other members of the public and transportation agencies.[3]		Chicago, IL; Cincinnati, OH; Philadelphia, PA; and Portland, OR used OpenPlans to gather community input on bikeshare station locations[5]	MaineDOT "posts planning and project questions on mySidewalk, facilitating real-time collection of feedback from local residents and other transportation customers."[3 pg. 11]

1- Bryer, 2013; 2- Bregman & Watkins; 3- MaineDOT, 2015; 4- Camay, et al., 2012; 5- Piatkowski & Afzalan, 2015; 15- TRB

(Bregman), 2012; 16- DOT, 2015

Table C2. Social media platform use by demographic marker nationwide

	Platform (% use nationwide)					
Platform	Facebook	Video-sharing (YouTube, Vimeo)	Pinterest	Instagram	Twitter	Snapchat
Group						
Gen Pop, 18+ (all adults)	68[1]	48 (YouTube specific)[11]	26[1]	28[1]	21[1]	10[11]-14.3[9]
Gen Pop, 18+ (online adults)	79[1]	63 (YouTube specific)[3]-72[8]	31[1]	32[1]	24[1]	24.2 (smartphone users)[9]
Age						
18-29 (online adults)	88[1]	82 (YouTube specific)[3]-92[8]	36[1]	59[1]	36[1]	26[7]
30-49 (online adults)	84[1]	81[8]	34[1]	33[1]	23[1]	5[7]
50-64 (online adults)	72[1]	50[8]	28[1]	18[1]	21[1]	3[7]
65+ (online adults)	62[1]	34 (YouTube specific)[3]-50[8]	16[1]	8[1]	10[1]	2[7]
Gender						
Male (online adults)	75[1]	NDA	17[1]	26[1]	24[1]	9[7]-22.7[10]
Female (online adults)	83[1]	NDA	45[1]	38[1]	25[1]	10[7]-25.6[10]
Race						
Black (online adults)	67[2]	76 (YouTube specific)[3]	12[2]	38[2]	22[4]-27[2]	8[7]
Hispanic (online adults)	73[2]	74 (YouTube specific)[3]	21[2]	34[2]	25[2]	NDA
Asian American (online adults)	NDA	NDA	NDA	NDA	20[6]	NDA
White (online adults)	71[2]	57 (YouTube specific)[3]	32[2]	21[2]	21[2]	7[7]
Education						
High school grad or less (online adults)	77[1]	67[8]	24[1]	27[1]	20[1]	10[7]
Some college (online adults)	82[1]	75[8]	34[1]	37[1]	25[1]	9[7]
College+ (online adults)	79[1]	75[8]	34[1]	33[1]	29[1]	8[7]
Income						
<$30K/yr. (online adults)	84[1]	54[8]	30[1]	38[1]	23[1]	12[7]
$30K-49.9K/yr. (online adults)	80[1]	52[8]	32[1]	32[1]	18[1]	5[7]
$50K-74.9K/yr. (online adults)	75[1]	52[8]	31[1]	32[1]	28[1]	7[7]
$75K+/yr. (online adults)	77[1]	66[8]	35[1]	31[1]	30[1]	9[7]
Location						
Urban (online adults)	81[1]	NDA	30[1]	39[1]	26[1]	NDA
Suburban (online adults)	77[1]	NDA	34[1]	28[1]	24[1]	NDA
Rural (online adults)	81[1]	NDA	25[1]	31[1]	24[1]	NDA
Note: All adults = all U.S. adults 18 and over; online adults = all adults 18+ who use the internet						

1-Pew, 2016b; 2-Pew, 2015e; 3-Pew, 2014c; 4-Pew, 2014a; 5-Pew, 2014b; 6-Pew, 2011b; 7-Pew, 2013b; 8-Pew, 2013c; 9-eMarketer, 2016a; 10-eMarketer, 2016b; 11-AASHTO, 2015; 12-MnDOT, 2011

Table C3. Social media platform use among transportation agencies

	Platform (% Use)					
Group	Twitter	Facebook	Video-sharing (YouTube, Vimeo)	Instagram	Pinterest	Snapchat
State Transportation Agencies	95[11]	90[11]	80[11]	12[11]	15[11]	0[11]
Minnesota Cities and Counties (for transp. topics)	36[12]	40[12]	12 (YouTube specific)[12]	NDA	NDA	NDA

11-AASHTO, 2015; 12-MnDOT, 2011

Table C4. Adult's frequency checking social media platforms nationwide

	Platform (% Use)					
Frequency	Twitter	Facebook	Video-sharing (YouTube, Vimeo)	Instagram	Pinterest	Snapchat
Check daily (of specific platform users)	36[2]	70[2]	NDA	49[2]	17[2]	NDA
Check weekly (of specific platform users)	24[2]	17[2]	NDA	24[2]	29[2]	NDA
Check less than weekly (of specific platform users)	40[2]	12[2]	NDA	26[2]	52[2]	NDA

2-Pew, 2015e

APPENDIX D
SUPPLEMENTAL TELEPHONE INTERVIEW DATA TABLES

Table D1. Minnesota State Survey 2016 respondent demographics and Minnesota resident demographics

Variables	% Respondents	Variables	% MN (n=5,303,925)
Age (n=779)			
18-29	11.8	15-29	20.9
30-49	28.8	30-49	27.1
50-64	28	50-64	26.1
65+	31.4	65+	12.9
Income (n=700)		Income	
<$30K/y	18.1	<$35K/y	27.6
$30K-49.9K/y	17.6	$35K-49.9K/y	13
$50K-69.9K/y	13.9	$50K-74.9K/y	19
$70+K/y	50.4	$75+K/y	40.4
Education (n=812)		Education (age 25-64)	
High school grad or less	18.6	High school grad or less	28
Some college	35.2	Some college	35
At least college degree	46.2	At least college degree	37
Gender (n=820)		Gender	
Female	51.1	Female	50.4
Male	48.9	Male	49.6
Race (n=799)		Race	
White	84.8	White	85.3
Black	5.2	Black	5.2
Other	2.1	Other	NA
Asian/Pacific Islander	3.1	Asian/Pacific Islander	4
American Indian	2.4	American Indian	1.1
No dominant race	1.2	No dominant race	NA
Hispanic	1.2	Hispanic	4.7
Residential Location (n=820)		Residential Location	
Greater MN Area	46.1	Greater MN Area	
MN Metro Area	53.9	MN Metro Area	54.8

Note. Categorical groupings for age, education, and income of MSS 2016 Respondents based on Pew Research Center's standard report categorization. Due to data limitations, categorization differs for some groups between MSS 2016 and Minnesota resident data.

Table D2. Transportation planning participation by demographic marker among Minnesota State Survey 2016 respondents

Participation method	General planning	Contact public official	Input via email	Focus group	Social media	Community meeting/ hearing	Other
Group							
Gen Pop, 18+ (n=820)	22.1	20.7	19	16.4	15.7	10.7	10.6
Age							
18-29 (n=91-92)	22	12	16.3	11	23.9	4.3	12
30-49 (n=223-225)	25.9	20.4	15.2	18.8	13	14.2	13.3
50-64 (n=217-218)	23	18.3	20.6	18.9	14.7	8.3	12.8
65+ (n=240-245)	18.7	25.7	21.3	13.9	15.2	11.5	6.7
Gender							
Male (n=399-401)	19.8	19.7	20.3	16.7	14.3	11	11.3
Female (n=414-419)	24.2	21.7	17.7	16.1	17	10.5	10.1
Race							
White (n=670-677)	22.4	20.1	18.3	15.5	15	10.1	10.6
Non-White (n=120-122)	18.9	20.5	21.5	20.8	18	10.7	9
Education							
High school grad or less (n=149-151)	9.4	9.9	8.7	7.3	12	4.6	6.6
Some college (n=282-286)	18.8	22	21	18.9	17.9	11.6	10.2
At least college degree (n=374-375)	29.6	23.7	21.3	18.2	15.2	12.8	12.3
Income							
<30K/y (n=124-127)	17.7	17.5	15.9	13.5	16	12.6	10.4
30K-49.9K/y (n=123-124)	14.5	17.1	11.4	17.1	16.1	4.1	8.1
50K-69.9K/y (n=95-97)	19.6	16.5	20.6	14.7	10.3	8.2	10.3
70K+/y (n=350-354)	28.3	25.5	22.9	18.1	15.3	14.5	11.7
Residential Location							
MN Metro Area (n=438-441)	21.9	18.8	20.2	18.2	17	10	11.6
Greater MN Area (n=376-378)	22.1	22.8	17.5	14.3	14.1	11.6	9.6

Note. Categorical groupings for age, education, and income based on Pew Research Center's standard report categorization.

Table D3. Social media use by demographic marker among Minnesota State Survey 2016 respondents

	General social media use
Group	
Gen Pop, 18+ (n=820)	71.5
Age	
18-29 (n=92)	95.7
30-49 (n=224)	88.4
50-64 (n=217)	72.4
65+ (n=244)	46.3
Gender	
Male (n=402)	66.7
Female (n=419)	76.1
Race	
White (n=677)	69.6
Non-White (n=122)	83.6
Education	
High school grad or less (n=151)	56.3
Some college (n=286)	73.4
At least college degree (n=375)	76.8
Income	
<30K/y (n=127)	65.4
30K-49.9K/y (n=123)	65
50K-69.9 K/y (n=97)	68
70K+/y (n=353)	77.6
Residential Location	
MN Metro Area (n=442)	77.1
Greater MN Area (n=379)	64.9

Table D4. Platform use by demographic marker among Minnesota State Survey 2016 social media users

	Platform (% use)						
Platform	Facebook	YouTube	Pinterest	Instagram	Twitter	Snapchat	Other
Group							
Gen Pop, 18+	91.7	87.9	42.3	31.6	29.7	25.6	14.6
Age							
18-29 (n=88)	93.2	98.9	36.4	59.1	40.9	78.4	26.7
30-49 (n=198)	91.3	94.4	45.6	40.3	35.5	25	13.8
50-64 (n=157)	89.9	84.1	51.9	22.8	24.1	13.5	9.7
65+ (n=113)	91.2	74.3	29.2	13.2	20.4	5.3	13.6
Gender							
Male (n=268)	88.3	91.4	21.7	27.1	28.6	24.5	16.8
Female (n=319)	94.4	84.9	59.2	35.4	30.5	26.5	12.8
Race							
White (n=471)	90.6	86.6	41.5	28.3	28.7	22.8	13.2
Non-White (n=102)	95.1	94.1	46	46.1	32.4	40.2	19.8
Education							

High school grad or less (n=85)	96.5	77.6	29.4	24.7	21.2	34.9	11.8
Some college (n=210)	89	87.1	42.5	29.8	24	27.4	15
At least college degree (n=288)	92	91.7	46.3	34.8	36.2	22	14.9
Income							
<30K/y (n=83)	94	89	30.5	33.7	31.7	34.1	18.1
30K-49.9K/y (n=80)	90	81.3	43	26.3	22.5	25	10
50K-69.9 K/y (n=66)	92.4	87.9	48.5	19.7	16.7	26.2	10.9
70K+/y (n=274)	91.9	90.9	44.2	36.6	35	25.5	13.8
Residential Location							
MN Metro Area (n=341)	90.3	90.9	42.9	39.7	33.4	27.4	15
Greater MN Area (n=246)	93.4	84	41.4	20.2	24.6	23.4	13.7

Note. Categorical groupings for age, education, and income based on Pew Research Center's standard report categorization. Platform use is considered "daily, every other day, weekly, monthly, or less often". "N" is those who reported social media use.

Table D5. Platform use daily or every other day by demographic marker among Minnesota State Survey 2016 social media users

	Platform (Daily or every other day %use)						
Platform	Facebook	YouTube	Pinterest	Instagram	Twitter	Snapchat	Other
Group							
Gen Pop, 18+	70	31.2	7.3	13.8	9.9	14.6	9.2
Age							
18-29 (n=88)	80.7	63.6	7.9	40.9	17	63.6	11.6
30-49 (n=198)	69.9	35.2	5.6	13.8	10.7	10.7	8.8
50-64 (n=157)	65.2	19.6	9.5	7.6	9.5	2.6	6.4
65+ (n=113)	69.9	16.8	7	4.4	4.4	0.9	10.8
Gender							
Male (n=268)	60	37.6	2.3	12.8	10.5	13.6	10.7
Female (n=319)	78.4	25.8	11.3	14.4	9.4	15.5	7.7
Race							
White (n=471)	69.2	26.4	7.2	11.7	9.4	11.7	7.4
Non-White (n=102)	73.5	51	8	24.5	12.7	27.5	16.8
Education							

High school grad or less (n=85)	75.3	34.1	7.1	18.6	8.2	27.9	8.2
Some college (n=210)	70	31.6	5.3	12	7.2	13	9.7
At least college degree (n=288)	68.1	30	8.7	13.9	12.2	11.8	8.9
Income							
<30K/y (n=83)	74.7	41	3.6	20.5	11	22	14.5
30K-49.9K/y (n=80)	75	36.3	12.5	10	5	12.3	5
50K-69.9 K/y (n=66)	65.2	31.8	6.1	9.1	4.5	16.7	9.4
70K+/y (n=274)	68.9	29.2	7.3	15.4	12.8	12.4	7.1
Residential Location							
MN Metro Area (n=341)	67.8	35.5	5.6	15.9	11.2	14.5	7.8
Greater MN Area (n=246)	72.8	25.4	9.4	10.7	8.2	14.8	10.8

Note. Categorical groupings for age, education, and income based on Pew Research Center's standard report categorization. "N" is those who reported social media use.

Table D6. Interest in social media use activities for transportation planning by demographic among Minnesota State Survey 2016 respondents

Social media use activity	Receiving information	Providing feedback	Making suggestions
Group			
Gen Pop, 18+ (n=813-816)	37.3	36	35.4
Age			
18-29 (n=91-92)	43.5	48.9	51.6
30-49 (n=224-225)	38.2	42.7	42.4
50-64 (n=214-217)	33	32.7	33.6
65+ (n=240-243)	37.9	29	24.6
Gender			
Male (n=399-400)	33.6	33.5	33.5
Female (n=413-417)	40.8	38.5	37.2
Race			
White (n=670-673)	35.8	33.6	32.2
Non-White (n=122)	45.9	49.2	54.1
Education			
High school grad or less (n=149-151)	36.4	28	27.5

Some college (n=282-284)	36.9	38.7	36.6
At least college degree (n=372-375)	38.1	37.6	37.7
Income			
<30K/y (n=122-124)	43.5	41.9	38.5
30K-49.9K/y (n=121-123)	35	33.1	35.8
50K-69.9K/y (n=97-98)	36.7	34.7	33
70K+/yr. (n=352)	35.5	36.9	36.6
Residential Location			
MN Metro Area (n=439-440)	41.1	39.6	41
Greater MN Area (n=373-376)	33	31.6	28.7

Note. Interest includes "very interested" and "somewhat interested". Categorical groupings for age, education, and income based on Pew Research Center's standard report categorization.

Table D7. Interest in social media use activities for transportation planning by social media use among Minnesota State Survey 2016 respondents

Social media use activity	Receiving information	Providing feedback	Making suggestions
Social media use			
Users (n=584-586)	42.9	43.3	43.5
Non-users (n=228-231)	22.9	17.5	14.5

Note. Interest includes "very interested" and "somewhat interested".

Table D8. Comparing gender, race, location, and social media use on interest in social media use activities among Minnesota State Survey 2016 respondents

	Receiving information	Providing feedback	Making suggestions
Gender			
Male (n=218-231) Median	2	2	2
Mean Rank	262.36	250.77	232.37
Female (n=245-281) Median	2	2	2
Mean Rank	251.68	239.14	231.67
U-statistic	31,101	28,177.50	26,625
p-value	0.373	0.319	0.951
Race			
White (n=372-422) Median	2	2	2
Mean Rank	254.99	244.71	234.62
Non-White (n=76-81) Median	2	2	2
Mean Rank	219.01	201.46	192.02
U-statistic	13,719	12,755.50	12,233
p-value	0.028*	0.005*	0.004*
Location			
MN Metro Area (n=261-279) Median	2	2	2

Mean Rank	240.34	231.05	217.13
Greater MN Area (n=202-233) Median	2	2	2
Mean Rank	275.85	261.72	251.21
U-statistic	27,994	25,632.50	22,480
p-value	0.003*	0.009*	0.003*
Social media use			
Social media users (n=379-401) Median	2	2	2
Mean Rank	253.27	235.87	220.74
Non-users (n=84-111) Median	2	3	2
Mean Rank	268.18	278.83	282.82
U-statistic	23,552.5	22,474.5	20,186.5
p-value	0.303	0.003*	0.000*

Note: Measured on a 3-point scale: 1=Very interested; 2=Somewhat interested; 3=Not very interested;

** indicates statistical significance at .05 level*

Table D9. Comparing age, income, and education on interest in social media use activities among Minnesota State Survey 2016 respondents

Age	Receiving information	Providing feedback	Making suggestions
18-29 (n=87-88) Median	2	2	2
Mean Rank	255.75	234.65	217.24
30-49 (n=198-199) Median	2	2	2
Mean Rank	238.47	206.86	204.93
50-64 (n=155-158) Median	2	2	2
Mean Rank	250.49	230.66	212.38
65+ (n=112-113) Median	2	2	2
Mean Rank	236.97	254.78	244.62
H-statistic	1.564	11.32	8.585
p-value	0.667	0.010*	0.035*
Income			
<30K/yr. (n=82) Median	2	2	2
Mean Rank	199.76	199.65	198.96
30-49.9K/yr. (n=79-81) Median	2	2	2
Mean Rank	230.9	218.17	196.81
50-69.9K/yr. (n=66-67) Median	2	2	2
Mean Rank	221.21	220.73	213.26
70K+/yr. (n= 273-274) Median	2	2	2
Mean Rank	222.14	208.14	199.86
H-statistic	3.633	1.811	0.92
p-value	0.304	0.613	0.821
Education			
High school grad or less (n=85) Median	2	2	2
Mean Rank	248.2	256.34	237.38
Some college (n=209-211) Median	2	2	2
Mean Rank	257.72	240.42	230.29
At least college degree (n=285-288) Median	2	2	2
Mean Rank	255.77	240.32	228.43
H-statistic	0.329	1.048	0.292
p-value	0.848	0.592	0.864

Note: Measured on a 3-point scale: 1=Very interested; 2=Somewhat interested; 3=Not very interested

** indicates statistical significance at 0.05 level*

Table D10. Comparing gender, race, and location on platform use frequency among Minnesota State Survey 2016 platform users

Platform	Facebook	YouTube	Pinterest	Instagram	Twitter	Snapchat	Other
Gender							
Male (n=268) Median	1	2	3	2	2	1	1
Mean Rank	284.25	225.97	129.92	83.04	79.23	72.17	42.89
Female (n=319) Median	1	2	3	2	2	1	1
Mean Rank	246.3	270.52	118.85	91.23	84.3	70.97	43.12
U-statistic	29,049	36,431	4,847.50	3,999	3,498	2,446.50	905
p-value	0.000*	0.000*	0.239	0.264	0.457	0.846	0.959
Race							
White (n=471) Median	1	2	3	2	2	1	1
Mean Rank	256.02	257.19	118.36	88.45	78.95	73.58	44.83
Non-White (n=102) Median	1	1	3	1	2	1	1
Mean Rank	258.73	185.01	128.12	76.23	79.21	61.61	33.08
U-statistic	19,191	12,461	4,563	2,264.50	1,862	1,552	451.5
p-value	0.831	0.000*	0.251	0.138	0.976	0.087	0.026
Location							
MN Metro Area (n=341)							
Median	1	2	3	2	2	1	1
Mean Rank	266.55	240.97	129.14	91.19	81.23	74.49	47.41
Greater MN Area (n=246)							
Median	1	2	2	1	3	1	1
Mean Rank	258.34	262.2	110.66	79.55	83.36	66.77	36.38
U-statistic	34,880	27.259	8,184.50	3,453.50	2,988	2,652.50	1,092
p-value	0.408	0.087	0.023*	0.147	0.764	0.22	0.018*

Results were categorized on a 3-point scale: 1=Daily/Every other day; 2=Weekly; 3=Monthly/Less often

** indicates statistical significance at 0.05 level*

Table D11. Comparing age, income, and education on platform use frequency among Minnesota State Survey 2016 platform users

Platform	Facebook	YouTube	Pinterest	Instagram	Twitter	Snapchat	Other
Age							
18-29 (n=88) Median	1	1	2	1	2	1	2
Mean Rank	223.72	156.04	102.91	62.37	63.29	52.18	48.9
30-49 (n=198) Median	1	2	3	2	3	2	1
Mean Rank	250.88	230.21	118.66	97.42	85.24	80.17	38.25
50-64 (n=157) Median	1	3	3	2	2	3	1
Mean Rank	260.87	280.33	125.75	91.18	70.73	94.68	41.34
65+ (n=113) Median	1	2	3	2	3	2	1
Mean Rank	247.94	266.51	101.74	101.03	88.76	94.21	35.09
H-statistic	6.307	51.748	5.914	19.561	8.879	32.201	5.029
p-value	0.098	0.000*	0.116	0.000*	0.031	0.000*	0.17
Income							
<30K/yr. (n=83) Median	1	2	3	1	2	1	1
Mean Rank	221.17	204.65	110.35	63.91	70.85	56.64	27.93
30-49.9K/yr. (n=80) Median	1	2	2	2	3	2	2
Mean Rank	206.29	200.44	90.34	81.91	83.67	72.1	38.11
50-69.9K/yr. (n=66) Median	1	2	3	2	2	1	1
Mean Rank	239.28	224.09	120.56	74.69	68.2	57.41	26.56
70K+/yr. (n=274) Median	1	2	3	2	2	2	1
Mean Rank	231.44	221.33	103.18	80.83	69.25	66.52	37.24
H-statistic	5.187	2.641	5.782	3.788	2.481	3.581	5.389
p-value	0.159	0.45	0.123	0.285	0.479	0.31	0.145
Education							
HS grad or less (n=85) Median	1	2	3	1	2	1	1
Mean Rank	256.32	241.81	116.17	63.07	79.5	56.19	39.35
Some college (n=210) Median	1	2	3	2	3	2	1
Mean Rank	252.05	245.53	131.59	91.73	85.3	77.65	41.77
College+ (n=288) Median	1	2	3	2	2	1	1
Mean Rank	269.74	252.2	116.13	90.28	79.92	73.33	43.76
H-statistic	2.876	0.437	3.357	6.477	0.546	6.796	0.42
p-value	0.237	0.804	0.187	0.039*	0.761	0.033*	0.811

Results were categorized on a 3-point scale: 1=Daily/Every other day; 2=Weekly; 3=Monthly/Less often

** indicates statistical significance at 0.05 level*

APPENDIX E
PLATFORM USER DESCRIPTIONS

Facebook is the most used and most frequently used platform among Minnesotan social media users (91.5% use; Figure 10, Table D6). 70% use it daily or every other day (Figure 10, Table D5). Daily/every other day use is

- … highest among 18-29 year olds (80.7%), those with an annual household income of $30K to $49.9K (75%), those with a high school degree or less (75.3%), females (78.4%), non-Whites (73.5%), and greater Minnesota residents (72.8%).
- … and lowest among those 50-64 years old (65.2%), those with an annual household income of $50K to 69K (65.2%), with at least a college degree (68.1%), males (60%), Whites (69.2%), and metro area residents (67.8%), though a majority still report use (Table D5).

YouTube is used by 87.9% of Minnesotan social media users (Figure 10, Table D5). 31.2% use it daily or every other day (Figure 10, Table D5). Daily/every other day use is

- … highest among those between 18 and 29 years of age (63.6%), those with annual household incomes of $30K or less (41%), respondents with high school diploma or less (34.1%), males (37.6%), non- Whites (51%), and metro area residents (35.5%).
- … and lowest among those over 65 years of age (16.8%), in households earning between $70K+ annually (29.2%), those with at least a college degree (30 %), females (25.8%), Whites (26.4%), and greater Minnesota residents (25.4%; Table D5).

Pinterest is used by 42.3% of Minnesotan social media users (Figure 10, Table D4). Use daily or every other day is lower than for YouTube and Facebook at 7.3% (Figure 10, Table D5). Daily/every other day use is

- … highest among those 50-64 years of age (9.5%), those in households earning between $30K and 49.9K annually (12.5%), those with at least a college degree (8.7%), females (11.3%), non-Whites (8%), and greater Minnesota residents (9.4%).
- … and lowest among those aged 30 to 49 (5.6%), those with household incomes of $30K or less annually (3.6%), those with some college (5.3%), males (2.3%), Whites (7.2%), and metro area residents (5.6%; Table D5).

Instagram is used by 31.6% of Minnesota social media users (Figure 10, Table D4). 13.8% use daily or every other day (Figure 10, Table D5). Daily/every other day use is

- … highest among those between 18 and 29 years (40.9% daily or every other day), those with an annual household income of $30K or less (20.5%), high school graduates or less (18.6%), females (14.4%), non-Whites (24.5%), and metro area residents (15.9%).
- … and lowest among those 65 years or over (4.4%), those with a household income of $50K to 69.9K annually (9.1%), those with some college education (12%), males (12.8%), Whites (11.7%), and greater Minnesota residents (10.7%; Table D5).

Twitter is used by 29.7% of Minnesotan social media users (Figure 10, Table D4). 9.9% use it daily or every other day (Figure 10, Table D5). Daily/every other day use is

- … highest among those between 18 and 29 years (17%), those with an annual household income over $70K (12.8%), those with at least a college degree (12.2%), males (10.5%), non-Whites (12.7%), and metro area residents (11.2%).
- … and lowest among those over 65 years (4.4%), those with an annual household income of

  $50K to 69.9K (4.5%), those with some college education (7.2%), females (9.4%), Whites (9.4%), and greater Minnesota residents (8.2%; Table D5).

Snapchat was the platform used least by Minnesota social media users (25.6%), aside from "other" (14.6%; Figure 10, Table D4). Daily or every other day use is higher than Twitter or Pinterest, at 14.6% (Figure 10, Table D5). Daily/every other day use is

- … highest among those between 18 and 29 years (63.6%), those with an annual household income of $30K or less (22%), those with a high school diploma or less (27.9%), females (15.5%), non-Whites (27.5%), and greater Minnesota residents (14.8%).
  … and lowest among those 65 years and older (0.9%), those with an annual household income between $30K and 49.9K (12.3%), those with at least a college degree (11.8%), males (13.6%), Whites (11.7%), and metro area residents (14.5%; Table D5).

APPENDIX F
CASE DESCRIPTIONS

Table F1. Case descriptions, time periods, social media descriptions, and locations.

Case Number and locale	Case Description	Time Period	Social Media Use	Social Media Nodes*	# of Nodes	Location
Case 1A: Richfield - Portland Avenue	The Portland Avenue reconstruction project in Richfield improved safety for pedestrians, bicyclists, and vehicles, improved the condition of the pavement, and replaced the deteriorating roadway and the sidewalks	10/13 – 10/16	Heavily used	City of Richfield (F,T,Y) , Sweet Streets – City of Richfield (F), Richfield Bike Advocates (F), Richfield Community Page (F)	6	Metro MN
Case 1B: St. Paul - Snelling Avenue	The Snelling Avenue reconstruction project in the St.Paul – Hamline Midway area resurfaced existing pavement, updated pedestrian crossings, and constructed Bus Rapid Transit sidewalk platforms.	6/12 – 11/15	Lightly used	MnDOT News (F, T, Y), City of St. Paul (F), Union Park District Council (F), Met Council (T), Metro Transit (T)	7	Metro MN

Case 2A: Red Wing - Highway 61	The Highway 61 reconstruction project in Red Wing updated utilities infrastructure, repaired pavement, and improved streetscapes and streetlights to support safety, mobility, and commerce and tourism in downtown Red Wing.	9/13 – 8/16	Heavily used	City of Red Wing (F,T,Y) Red Wing Chamber of Commerce (F), Red Wing Police Department (F, T), Downtown Main Street Red Wing (F), MnDOT Southeast (T)	8	Greater MN
Case 2B: Detroit Lakes - Highway 10 & 59	The Highway 10/59 reconstruction project near Detroit Lakes resurfaced roads, reconstructed a frontage road, and extended Holmes Street to the new frontage road.	4/2013 – 7/2016	Lightly used	City of Detroit Lakes (T), Visit Detroit Lakes (F), Detroit Lakes Regional Chamber of Commerce (F)	3	Greater MN

** F – Facebook, T – Twitter, Y - YouTube*

APPENDIX G
SOCIAL MEDIA PATTERNS ACROSS CASE STUDIES

Results are first presented for overall social media data. Overall results compare Facebook Insights and Twitter Analytics, metrics across different social media nodes, use official and unofficial social media nodes, hashtags, reactions, and IAP2 categorization.

Facebook Insights and Twitter Analytics Demographics

Facebook Insights and Twitter Analytics revealed information about users' age, gender, and education. Those ages 25 - 44 are consistently the most reached by each project's Facebook nodes and Twitter nodes and those ages 13 – 24 and 65+ are consistently the least reached across cases with all levels of social media use. Differences exist in use by gender across Facebook and Twitter. In all Facebook Insights demographic data, female user impressions are roughly equal to male impressions or greater, by up to 30%. However, Twitter Analytics for City of Red Wing and Red Wing Police Department differ from this trend by having approximately 20% more male users than female users. Education data is only available for Twitter Analytics and indicates users for all case's Twitter pages are estimated to be approximately 50% users who have only a high school education.

Facebook Metrics Comparison

The cases which more heavily used social media, **Case 1A** along Portland Avenue in Richfield and **Case 2A** along Highway 61 in Red Wing had approximately 110 and 130 more Facebook posts than **Case 1B** along Snelling Avenue in St. Paul and **Case 2B** in Detroit Lakes respectively (145 and 143 posts compared to 34 and 9; Figure 1B; Table 1G, Appendix G). Furthermore, **Case 1A** along Portland Avenue in Richfield had more than 400 more comments than **Case 2A** and 500 more than **Case 1B** and **Case 2B (**Figure 1B; Table 1G, Appendix G). **Case 2B** in Detroit Lakes, which had the fewest number of Facebook posts of the four cases, had the largest number of comments per post (4.67), 25% more than **Case 1A** and approximately 400% more than **Case 2A** and **Case 1B** (Figure 2B; Table 1G, Appendix G). Each case had a comparable number of average likes per post, ranging between approximately 5 for **Case 2B** and 8 for **Case 2A** (Figure 2B; Table 1G, Appendix G). **Case 1B** along Snelling Avenue had the largest number of average shares per post (5.29), followed by **Case 2A** and **Case 2B** which had similar averages (2.08 and 2.22 respectively) and **Case 1A** along Portland Avenue had an average of .7 shares per post. (Figure 2B; Table 1G, Appendix G).

Available Facebook Insights data shared by social media node personnel reveals that Red Wing Police Department had the highest maximum number of daily impressions, more than 14,000 for a single post, approximately 60% more than Visit Detroit Lakes's maximum of almost 9,000 and more than 35 times the maximum impressions of the Facebook page with the fewest number of impressions, Richfield Bike Advocates (Figure 3B; Table 2G, Appendix G). Average Facebook impressions varied between 1569 for MnDOT to 24 for Richfield Bike Advocates (Figure 3B; Table 2G, Appendix G). Daily unique impressions have large standard deviations, indicating that users do not consistently interact with posts and the attention drawn to posts varies substantially depending on post content. Type of posts (status updates, YouTube links, photo updates) may also influence users reached. For example, the City of Richfield's post detailing Portland Avenue's opening ceremony only reached 288 unique users despite its significant content matter related to the completion of the project. A standard update via a link to a YouTube

video, one of many that was systematically provided throughout the project duration by city of Richfield, reached 1103 people. Finally, a post about sidewalk poetry, uploaded alongside a photo of that poetry, received 1650 unique users. All were posted at similar times of day (approximately 8:00 am - 11:00 am), during weekdays, and advertised information relevant to Portland Avenue construction (See Appendix F for Facebook screenshot examples). This trend of photo and video updates reaching significantly more Facebook users extends across posts related to Highway 61 construction in Red Wing as well as Snelling Avenue construction in St. Paul.

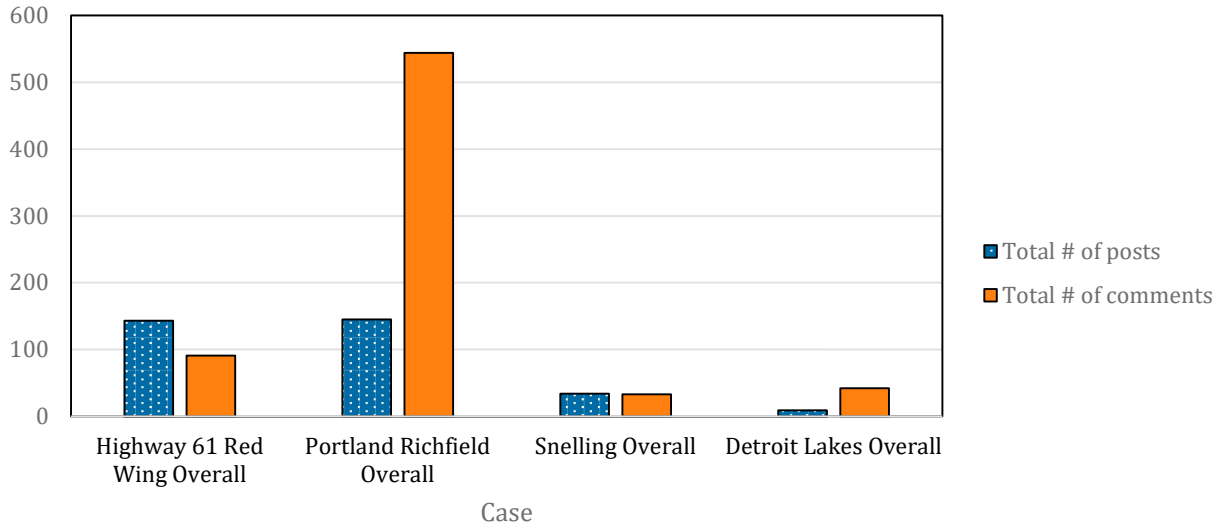


Figure G1. Number of Facebook posts and comments by study site.

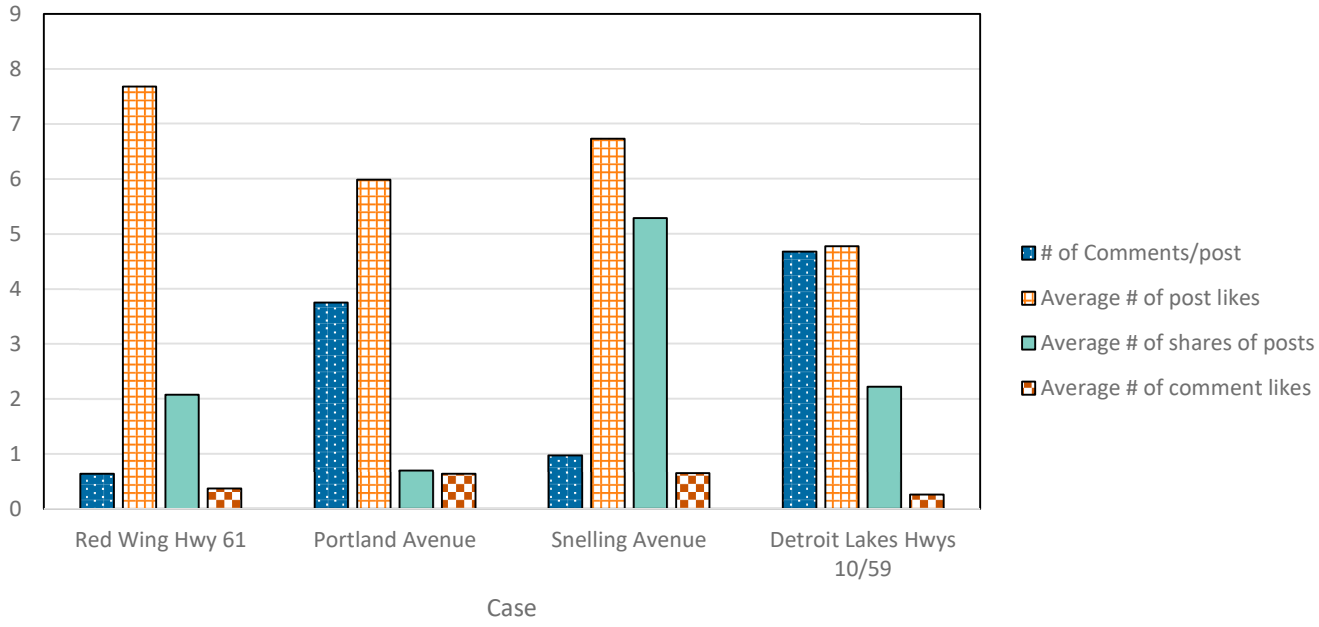


Figure G2. Number and average of Facebook comments, post or comment likes, and shares by case.

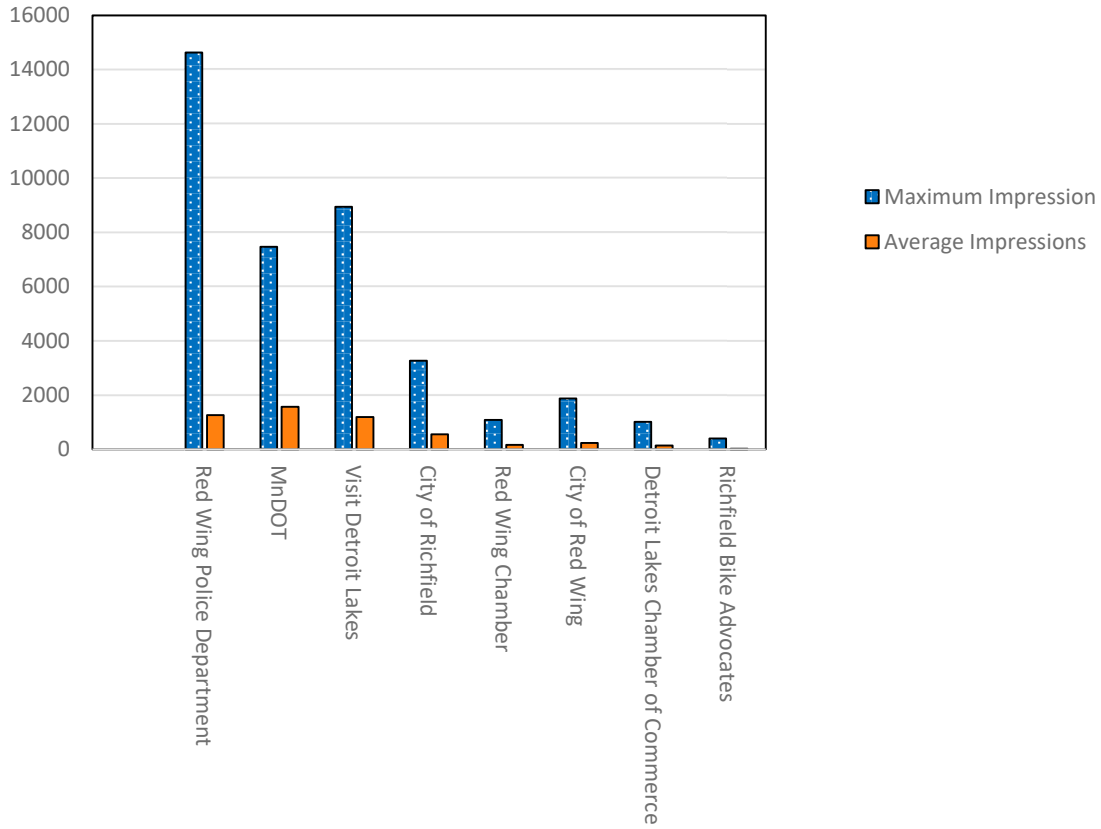


Figure G3. Facebook Insights maximum and average impressions by node

Twitter metrics comparison

Twitter was used much less extensively than Facebook overall. **Case 1A** along Portland Avenue in Richfield had the largest number of tweets associated with it (45), 9 more than **Case 1B** along Snelling Avenue in St. Paul and 21 more than **Case 2A** in Red Wing. **Case 2B** in Detroit Lakes had only a single project related tweet identified (Table 3G, Appendix G). Interactions with tweets in the form of replies, favorites, and retweets is low across all nodes, with only four Twitter replies identified for **Case 1B** and none for the other cases. (Table 3G, Appendix G).

Available Twitter Insights shared by social media node personnel indicated that MnDOT's Twitter had the maximum number of user impressions (32,205) with MnDOT Southeast and Met Transit having similar numbers of approximately 17,000 and City of Red Wing Twitter having a maximum of 2496 impressions. Met Transit had the highest average number of impressions (4580), followed by MnDOT (2570), MnDOT Southeast (946), and City of Red Wing (722; Figure 4B; Table 4G, Appendix G). For every node, standard deviations of Twitter impressions were at least 50% as large as average impressions, indicating high variability in Twitter impressions (Table 4G; Appendix G).

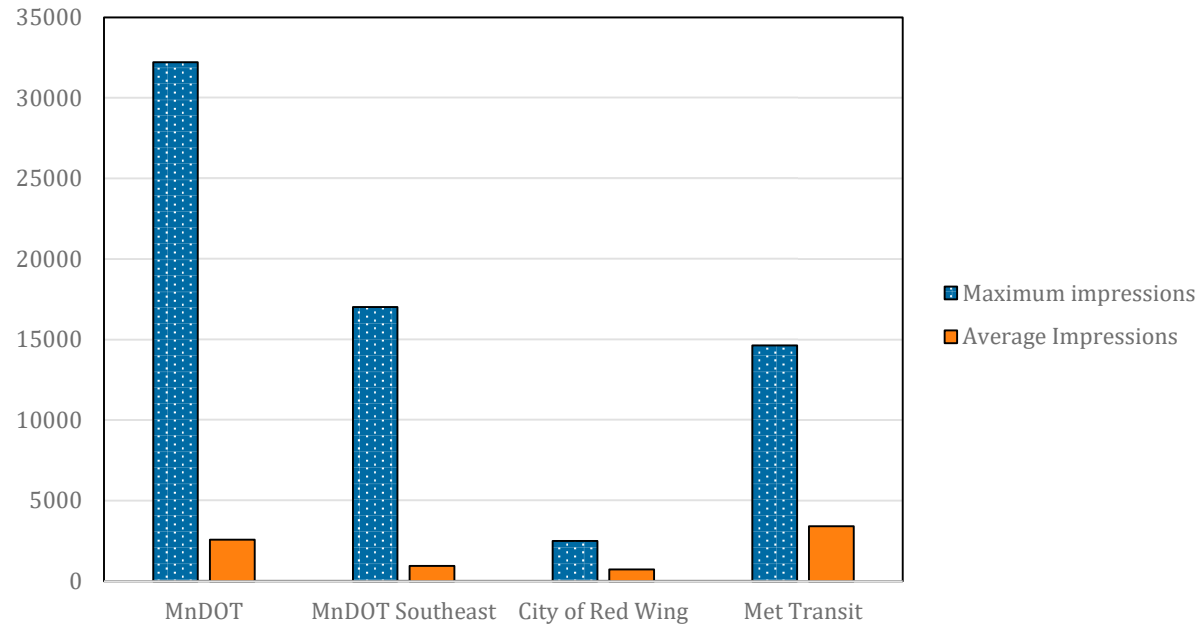


Figure G4. Maximum and average impressions on Twitter across study sites.

YouTube

YouTube was utilized by three of the four cases to upload videos and inform citizens of construction project status. There were few likes and comments on any YouTube videos, with only the City of Red Wing inspiring any comments (an average of .02; Table 5G, Appendix G). City of Red Wing and City of Richfield had comparable numbers of videos (45 and 41 respectively) while MnDOT only had a single video related to construction along Snelling Avenue (Figure 5B; Table 5G, Appendix B). MnDOT and City of Richfield both had approximately 150 views per video, while City of Red Wing had approximately 60 (Figure 5B; Table 5G, Appendix G).

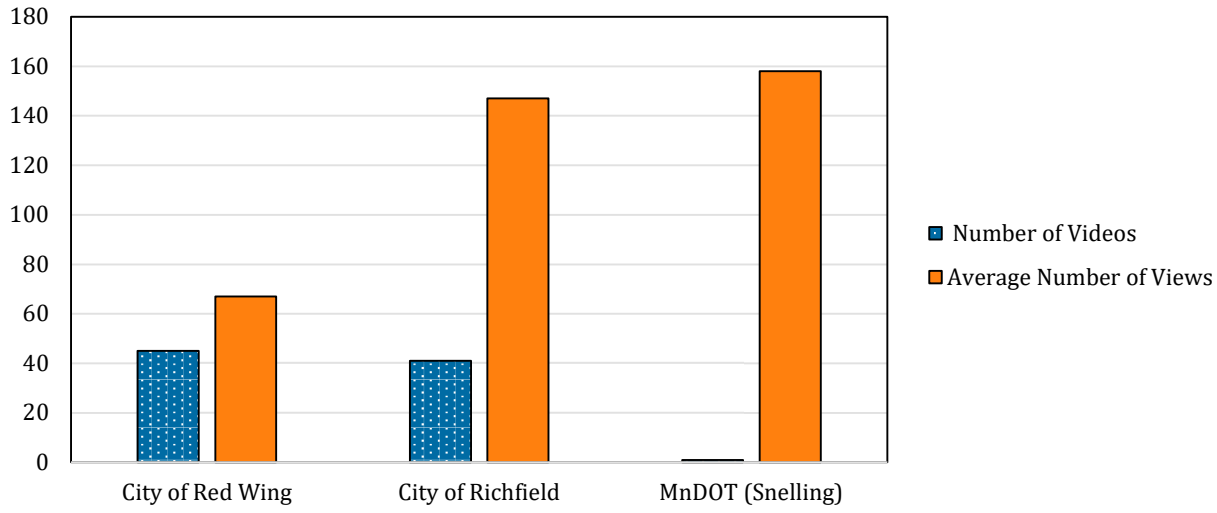


Figure G5. Number of YouTube videos and average number of video views across study sites.

Official vs. Unofficial Nodes

In the cases of Red Wing – Highway 61 and City of Richfield - Portland where unofficial pages had a sizeable presence, they differed from official nodes both in sentiment and in comment density. Posts on nodes such as the Richfield Bike Advocates, Richfield Community Page, and Downtown Main Street Red Wing had consistently larger numbers of comments on project related posts. In the case of the Richfield Community page, posts had an average of approximately 6 times as many comments (Table 1G, Appendix G). Sentiment also differed consistently across unofficial nodes; it was more common for comments to be 'off-topic.' For example, even if a thread of comments originated from an initial post that posed a question about ongoing construction, almost 40% of those comments veered off into discussion of other matters, related to personal lives of community members of other happenings of interest (Figure 24)

Twitter vs. Facebook vs. YouTube vs Blogs

The vast majority of comments and interactions took place on Facebook. Tweets were seldom interacted with in terms or retweets, replies, or favorites, but had similar impressions numbers and trends to Facebook impressions. More than 50% of tweets related to the respective projects linked to other social media or websites, where more detailed information relevant to the tweet is available. YouTube videos were viewed much less than Facebook posts or Tweets and also interacted with less. Blogs/forums seem to appeal to a niche base of transportation enthusiasts; mn.streets has many blogs and forum posts about ongoing transportation planning and projects across the state, although few were relevant to these example cases.

Hashtags

Hashtags appeared to only be utilized by community members to explicitly engage in transportation related conversation in the case of Snelling avenue reconstruction. Richfield also utilized hashtags to tag their posts related to Portland Avenue, for example by using #richfieldnow, but this hashtag was only used by community members to tag posts related to other events in Richfield, such as making a post about being at the Richfield Farmer's Market. Despite the apparent paucity of use of hashtags by posters, their use by official page personnel potentially allow for users to quickly and easily search for the specific project content they are interested in. In the case of #CelebrateSnelling, users could search the hashtag to learn about ongoing promotional events and support the construction by posting it themselves. City of Richfield's use of hashtags did not appear to allow such specific content curating.

Reactions

For the majority of Facebook social media nodes, likes and shares were the only reactions that occurred. 'Angry' reactions were occasionally used to signify project updates that were disruptive or undesirable, and 'love' and 'wow' reactions accompanied posts that also had many likes or shares (See Appendix F for examples)

IAP2 Categorization

Comments, questions, most posts simply shared information about construction progress, project updates, and public meetings. As such, social media engagement only realized the lowest form of participation on the IAP2 spectrum, informing through one-way communication. There is little evidence social media engagement realized meaningful dialogue and two-way communication to foster consultation or higher forms of participation.

APPENDIX H
SENTIMENT EXAMPLES

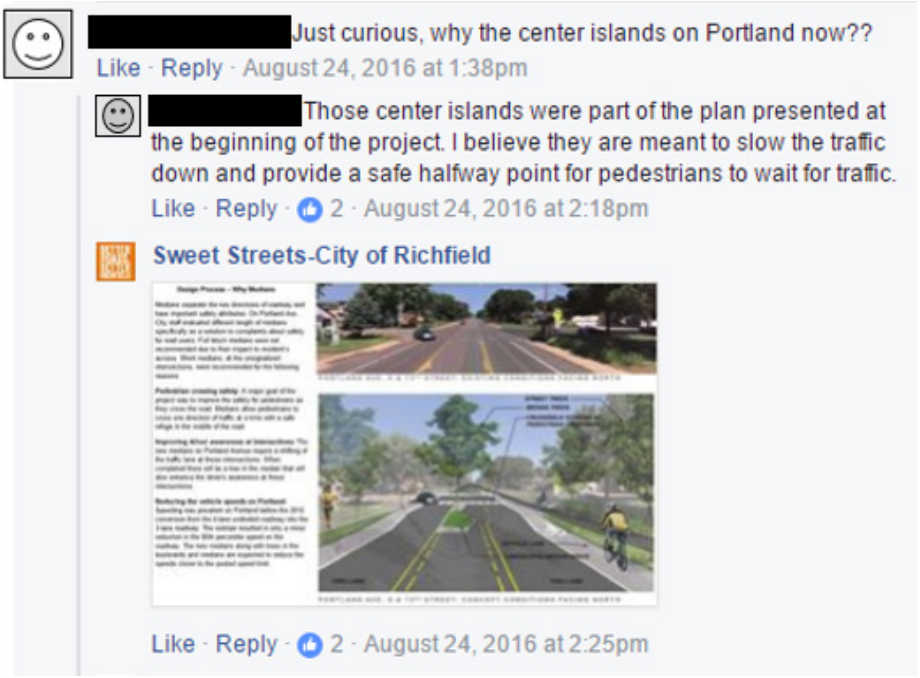


Figure H1. Example of Facebook being used to ask questions and provide answers, taken from Sweet Streets – City of Richfield

Figure H2. Positive sentiment examples

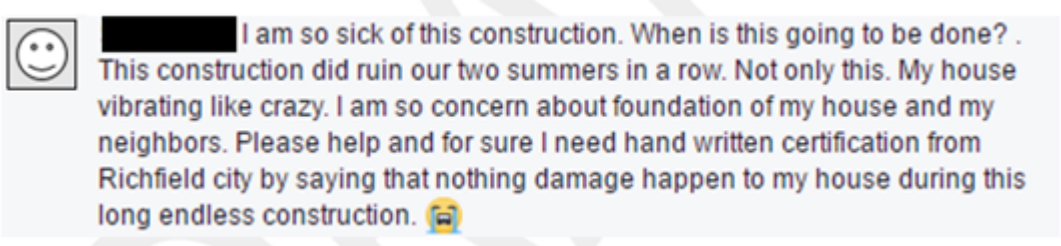


Figure H3. Negative sentiment example

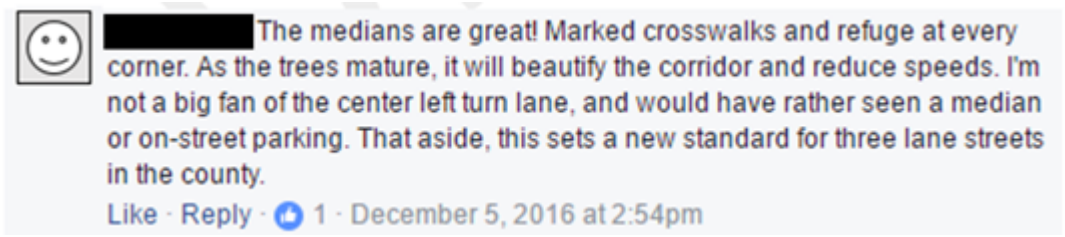


Figure H4. Balanced sentiment example

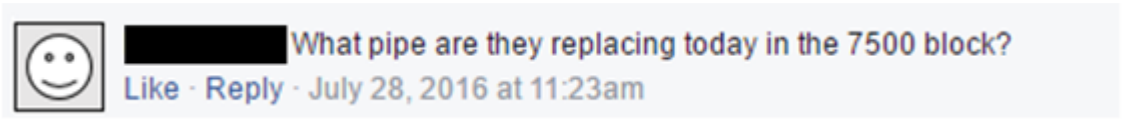


Figure H5. Neutral sentiment example.

Figure H6. Off-topic sentiment examples.

APPENDIX I
GLOSSARY OF SOCIAL MEDIA TERMS

Data mining – The process of collecting social media data such as reactions and comments from social media nodes.

Hashtag – A device used to organize information on social media. On both Facebook and Twitter, searching a term with a # symbol preceding it will display posts or tweets that have been labeled with that hashtag, or 'tagged'. For example, searching #CelebrateSnelling on Twitter will show tweets that have the same hashtag.

Facebook comment – A reply to a Facebook post or other comment

Facebook engagement – Number of users who clicked on clicked on a page or a page's posts; tracked daily and over 28-day intervals

Facebook impressions – The total number of views of a Faceook page or one of the page's posts; tracked daily and over 28-day intervals

Facebook Insights – Data available on every page's profile that contains information about like, followers, reach, and impressions.

Facebook post – A message provided by a Facebook page's administrator or group member

Facebook reach – Number of unique people who view a post; tracked daily and over 28-day intervals

Facebook wall – The area on a user profile or page where the user or page can post statuses, share status, and receive public messages from others.

Facepager – A data-mining program specifically designed for Facebook

NCapture – A Google Chrome extension, when used in conjunction with NVivo that enables data mining on social media nodes.

Twitter impressions – The number of views of a specific tweet.

Twitter engagements – The number of replies, likes, and retweets on a specific tweet

Twitter feed – The homepage of Twitter that displays tweets, retweets, and replies from your followers, as well as promotional tweets

Twitter Analytics – A selection of data on every user's profile that displays information about their respective tweets' engagement, likes, replies, and estimations about their Twitter account's audience details

Twitter followers – Users who follow a page will see their tweets, retweets, and replies on their twitter feed.

Retweet – Retweeting a tweet displays the selected tweets on the respective user's own twitter feed

Social media node – A Facebook, Twitter, or YouTube page

Share – Sharing a Facebook post displays the selected post on the respective user's own wall

APPENDIX J
SOCIAL MEDIA NODE DATA COLLECTION FLOW

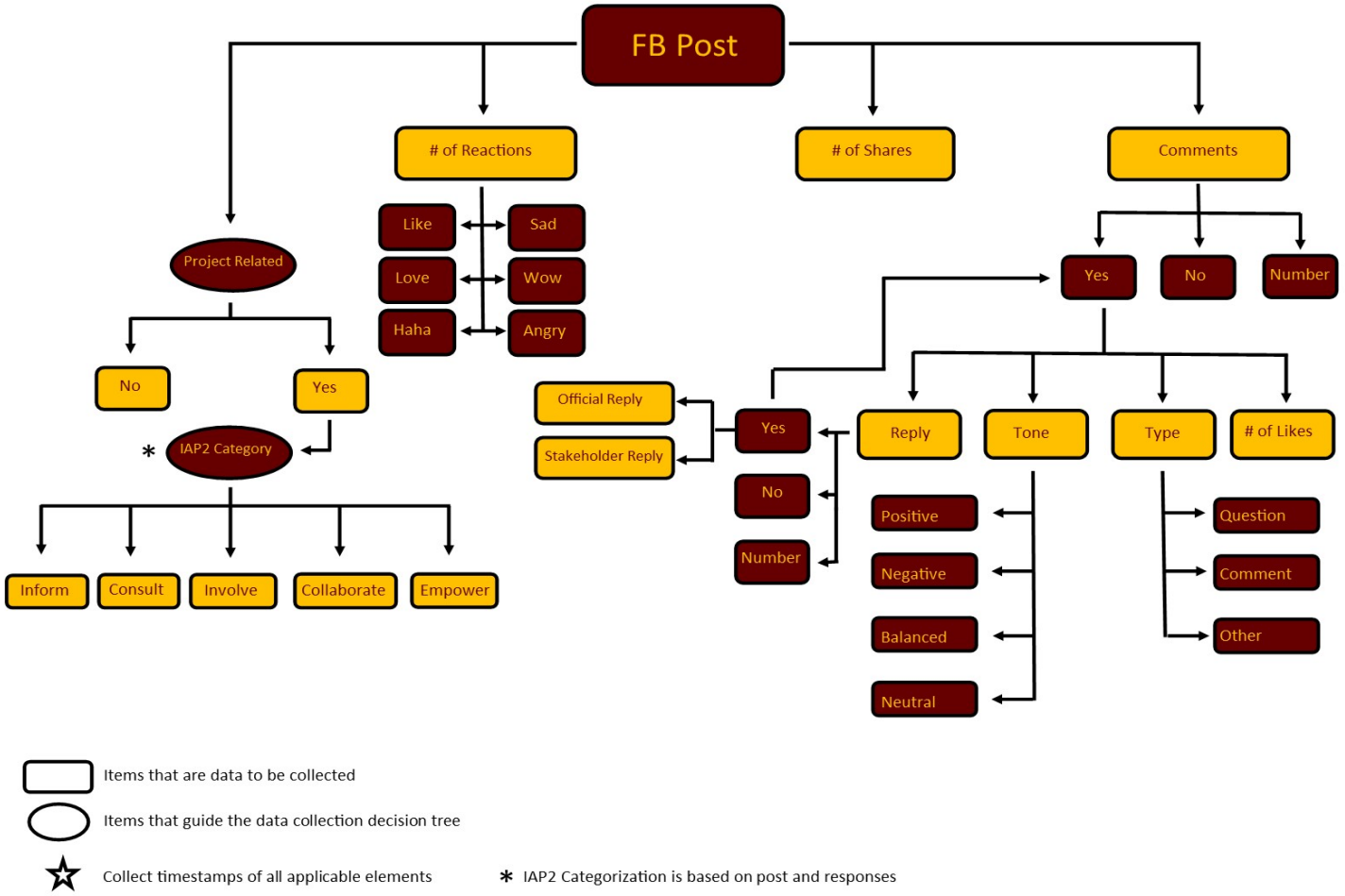


Figure J1. Facebook metric data collection flow chart.

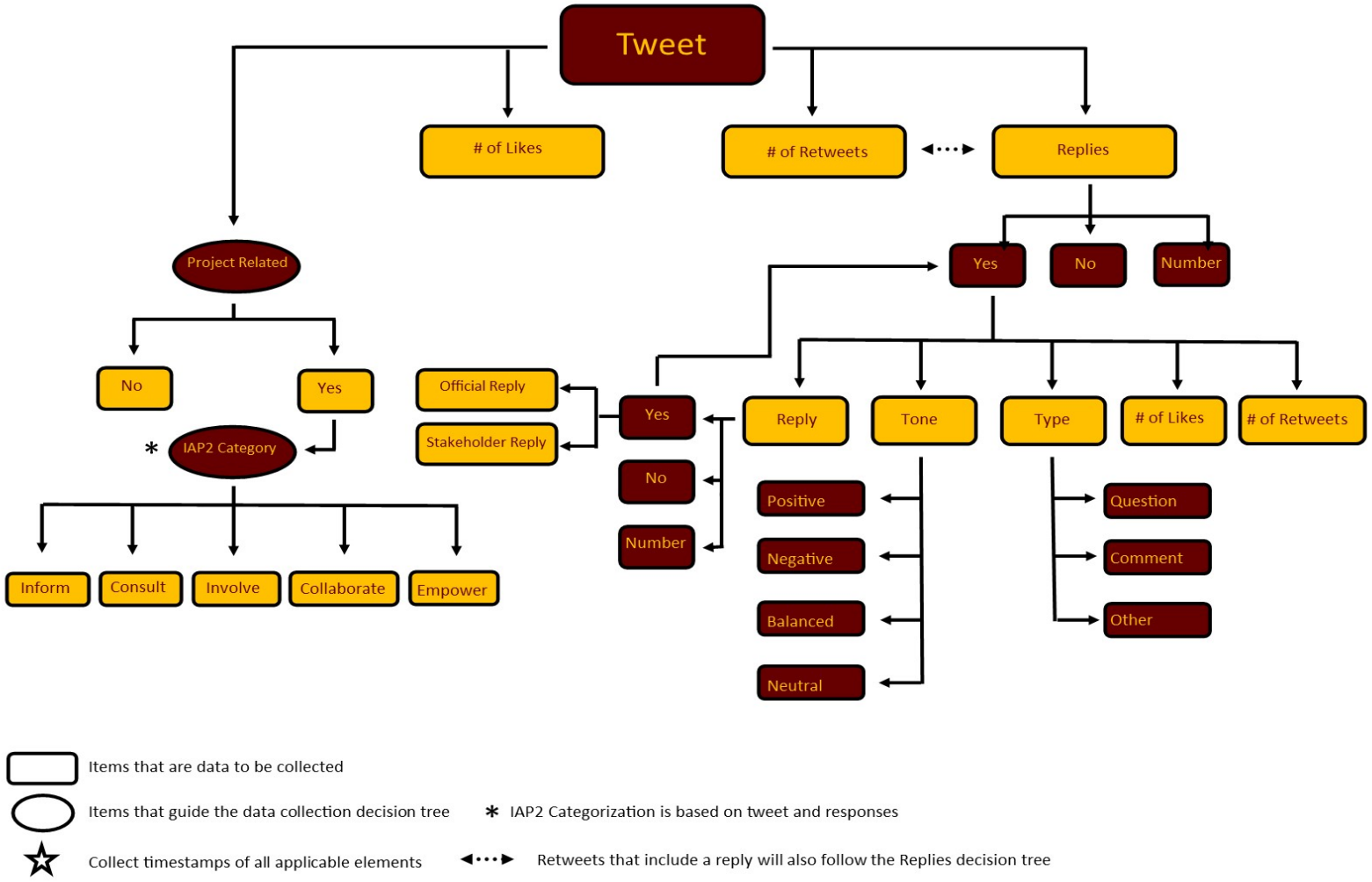


Figure J2. Twitter metric data collection flow chart.

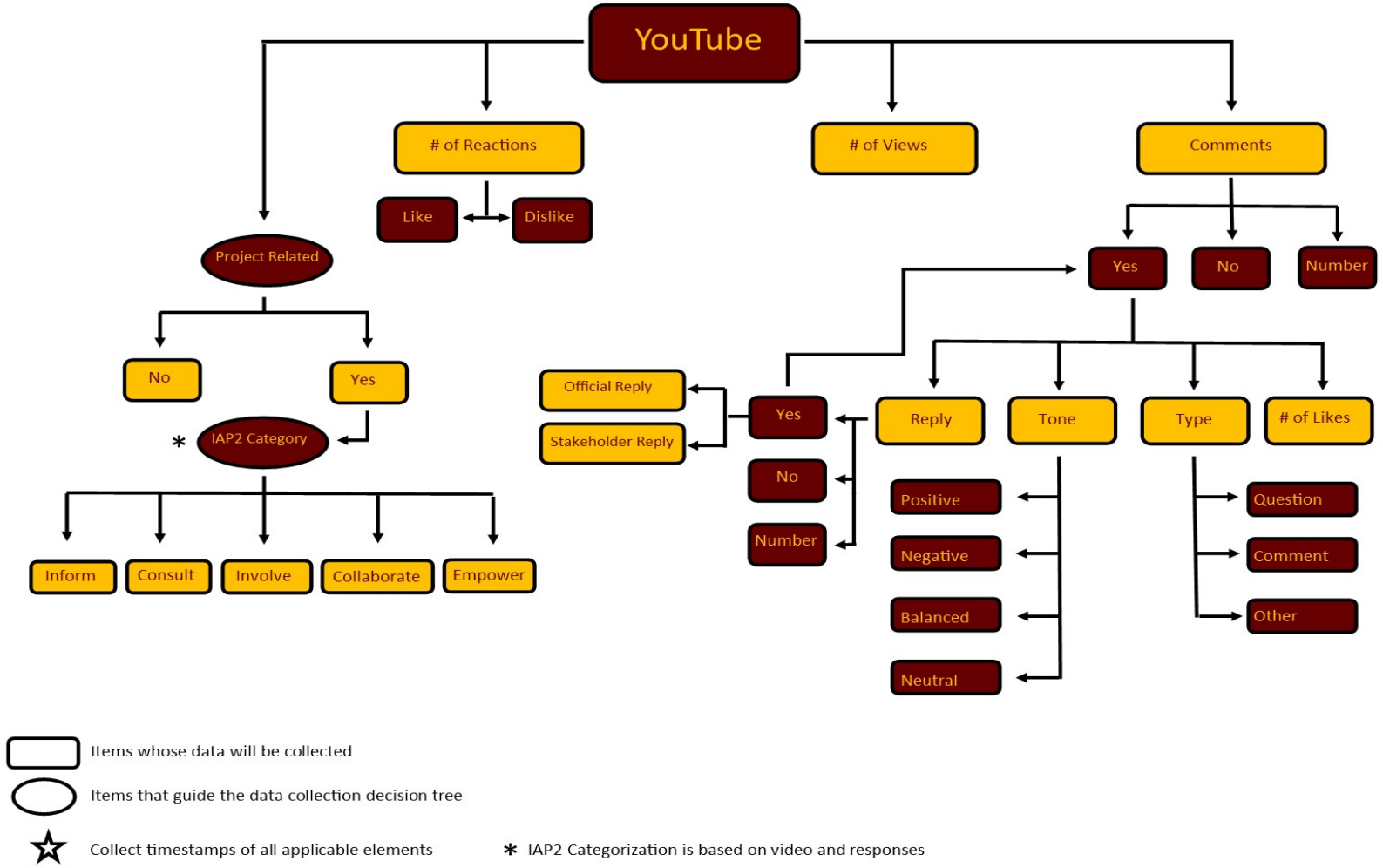


Figure J3. YouTube metric data collection flow chart.

APPENDIX K
REACTION USE AND POST EXAMPLES

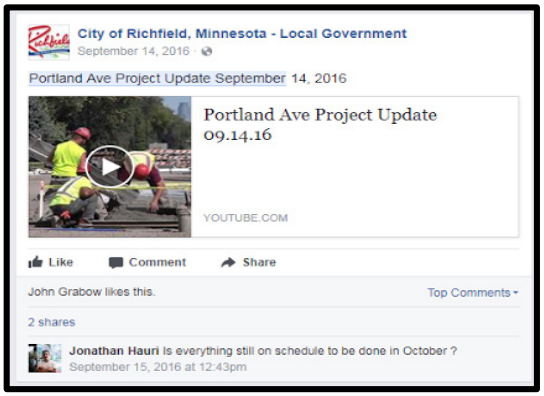


Figure K1. Example of YouTube video

Figure K2. Example of 'Love' and 'Wow' reactions often accompanying 'Likes'

Figure K3. Example of use of tweet hashtags to communicate project information

Figure K4. Example of embedding topical photos in Facebook posts

Figure K5. Example of use of 'Angry' reaction in response to project video regarding construction progress

APPENDIX L
SOCIAL MEDIA DATA TABLES

Table L1. Facebook posts, comments, likes, shares, and followers by case and node. Likes/members are as of June 2017.

Case	Total # of posts	Total # of comments	# of Comments/ post	Average # of post likes	Average # of shares of posts	Average # of comment likes	Page likes/ group members	Node description
Case 1A: Portland Richfield Overall	145	544	3.75	5.99	0.7	0.64	12209	
Sweet Streets Richfield	62	237	3.82	4.77	0.29	0.32	819	Richfield Sweet Streets is an extension of the City of Richfield and hosts information specifically about construction in Richfield
City of Richfield	60	70	1.17	3.97	1.18	0.14	6402	Shares a variety of information related to city matters
Richfield Bike Advocates	13	15	1.15	4.78	1	0.13	388	Richfield Bike Advocates is a group of citizen cyclists interested in improving cycling in Richfield
Richfield Community Page	10	230	23	27.2	0	1.15	4600	Richfield Community Page is a community created page where Richfield residents discuss anything
Case 2A: Highway 61 Red Wing Overall	143	91	0.64	7.68	2.08	0.37	13149	
City of Red Wing	59	31	0.53	4.92	1.03	0.45	3229	Shares a variety of information related to city matter
Downtown Main Street Red Wing	43	43	1	9.77	0.93	0.4	4671	A non-profit association of individuals and organizations that shares information related to Red Wing development and preservation
Red Wing Area Chamber of Commerce	21	6	0.29	9.52	2.1	0.33	1154	Shares information related to promoting the economic health of Red Wing
Red Wing Police Department	20	11	0.55	9.4	7.5	0.09	4095	Shares police and transportation news

Case 1B: Snelling Overall	34	33	.97	6.73	5.29	0.65	65119	
Union Park District Council	13	14	0.8	2.62	2.23	0.33	814	District council that shares a variety of information related to Union Park
Hamline Midway Coalition	9	2	.22	1.67	0	0	1303	District council that shares a variety of information related to Hamline Midway
MnDOT News	5	5	1	8.4	6.4	0.4	34886	Shares information related to transportation and construction throughout MN
City of St. Paul	4	12	3	18	31.5	1.08	23013	Shares a variety of information related to city matters
Hamline Midway Neighbors	3	0	0	4.25	0	0	5103	Hamline Midway community page where neighbors discuss anything
Case 2B: Detroit Lakes Overall	9	42	4.67	4.78	2.22	.26	20497	
Visit Detroit Lakes	6	40	6.67	5.33	1.32	.21	19504	Shares information related to Detroit Lakes region tourism
Detroit Lakes Region Chamber of Commerce	3	2	.67	3.67	4	.5	993	Shares information related to promoting the economic health of the Detroit Lakes region

Table L2. Facebook Insights maximum, average, and standard deviations of impressions by node as available.

Social Media Node	Maximum Impression	Average Impressions (Standard Deviations)
Case 1A: Portland Avenue		
City of Richfield	3264	554 (S.D. 589)
Richfield Bike Advocates	403	26 (S.D. 52)
Case 2A: Highway 61		
Red Wing Police Department	14627	1266 (S.D. 2070)
Red Wing Area Chamber	1090	164 (S.D. 211)
City of Red Wing	1882	240 (S.D. 374)
Case 1B: Snelling Avenue		
MnDOT	7469	1569 (S.D. 1742)
Case 2B: Detroit Lakes Highway 10/59		
Visit Detroit Lakes	8938	1190 (S.D. 1753)
Detroit Lakes Chamber of Commerce	1021	138 (S.D. 173)

Table L3. Twitter tweets, replies, favorites, retweets, and followers by case and mode.

Project	Total Number of Tweets	Total Number of Replies	Average Number of replies/post	Average Number of tweet favorites	Average Number of retweets	Twitter followers as of June 2017
Case 1A: Portland Richfield Overall	45	0	0	0.4	0.31	2926
City of Richfield	45	0	0	0.4	0.31	2926
Case 2A: Highway 61 Red Wing Overall	24	0	0	0.13	0.25	5069
Red Wing Police Department	15	0	0	0	.07	774
City of Red Wing	8	0	0	0.38	0.38	800
MnDOT Southeast	1	0	0	4	1	3495
Case 1B: Snelling Overall	36	4	0.11	0.94	1.42	122358
Hashtagged Data	15	4	0.29	1.79	1.36	-
MnDOT	12	0	0	0.58	1.5	27000
Met Council	3	0	0	0	0.33	8058
Metro Transit	3	0	0	0.33	2	26600
City of St. Paul	3	0	0	0	0	60700
Case 2B: Detroit Lakes Overall	1	0	0	0	1	1685

Table L4. Twitter maximum, average, and standard deviations of impressions by node as available.

Social Media Node	Maximum impressions	Average Impressions (Standard Deviations)
Case 2A: Highway 61		
MnDOT Southeast	17027	946 (S.D. 1141)
City of Red Wing	2496	722 (S.D. 556)
Case 1B: Snelling Avenue		
MnDOT	32205	2570 (S.D. 1794)
Met Transit	14625	3403 (S.D. 1895)

Table L5. YouTube videos, comments, thumbs ups and downs, views, and subscribes by mode.

Case	Total Number of Videos	Total Number of Comments	Average Number of Thumbs Up	Average Number of Thumbs Down	Average Number of Views	Subscribers as of June 2017
Case 1A: Portland Avenue						
City of Richfield	41	0	0.46	0.02	147	114
Case 2A: Highway 61						
City of Red Wing	45	0.02	0.16	0	67	153
Case 1B: Snelling Avenue						
MnDOT	1	0	0	0	158	1376

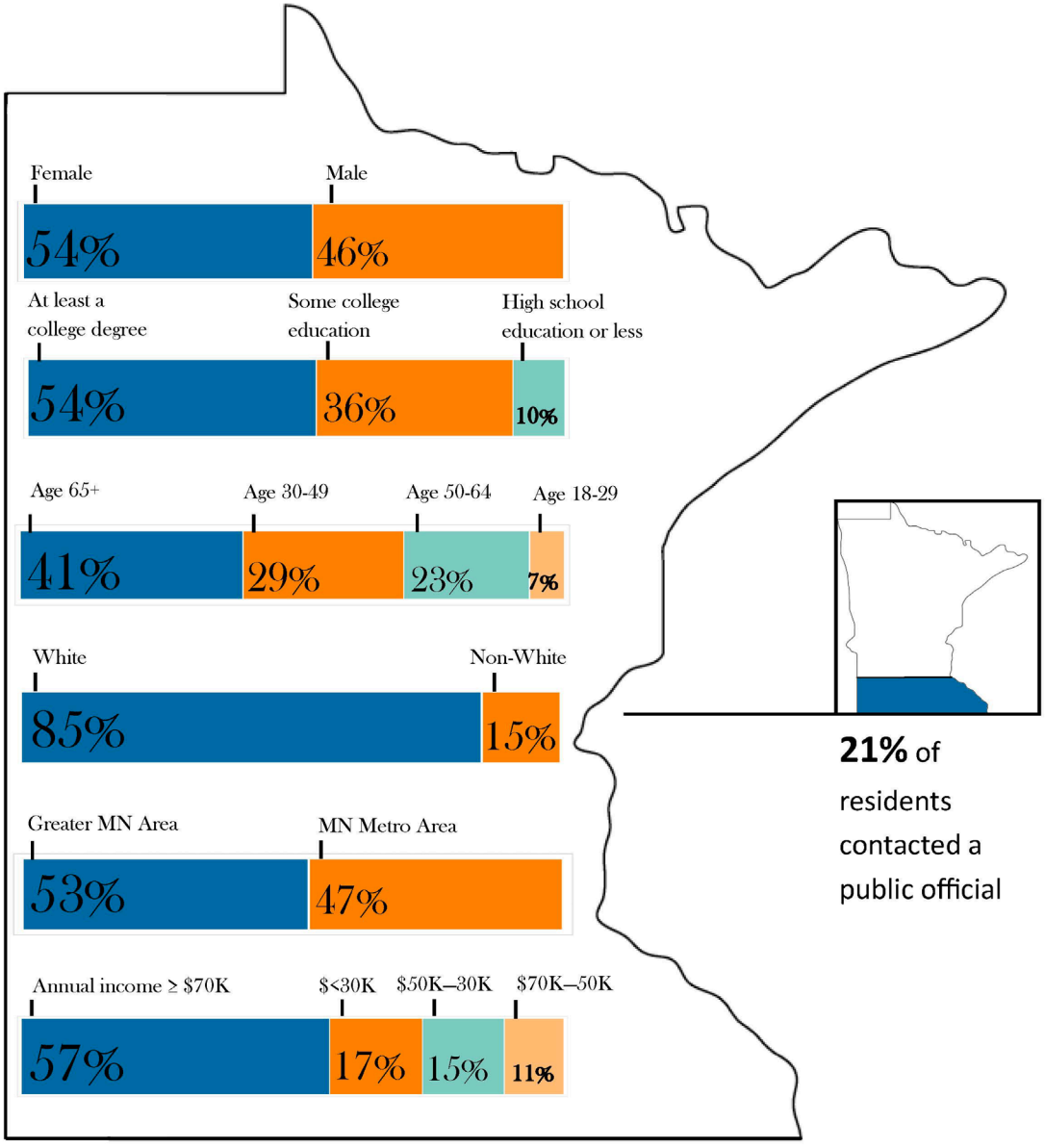
APPENDIX M
QUALITATIVE INTERVIEW QUESTIONS

Table M1. Interview questions for qualitative data collection, by topic area

Topic area	Interview questions
Basic information on participant's involvement	What was your interest in the project? How were you involved (e.g., receive information, participate in project design / decision, etc.)? How did you receive information or communicate with the decision-makers and coordinators of the project?
Impressions of public engagement process and outcome:	What is your impression of each of the following…. Did you feel satisfied, and why or why not? - the quality, timeliness, and mechanisms of communication - your level of impact on the project (decision, design, and implementation); - the construction and final product of the road project
Feedback on specific methods of engagement:	What worked well, and what did not work well about the methods that were used (customized for project, e.g., personal contacts, email, social media)? What was your preference, and why? Specifically, what is your impression about how **social media** was used, or could have been used?
Improvements	If you were to go through this project again, are there any improvements that you would suggest for how the [project team] communicated and coordinated with you? [The researchers listened and asked follow up questions regarding the frequency, content, and modes of communication.]
Snowball	Is there anyone else whom you would suggest that we talk with? We are particularly interested in reaching people who have an interest in the project, but did not participate very much in the discussions about it. Can you think of anyone we should talk with? For example, do you know someone who owns a property that will be affected, or people who frequently use a health clinic, or a school, or a business that is in the project area?

APPENDIX N
PUBLIC PARTICIPATION INFOGRAPHICS

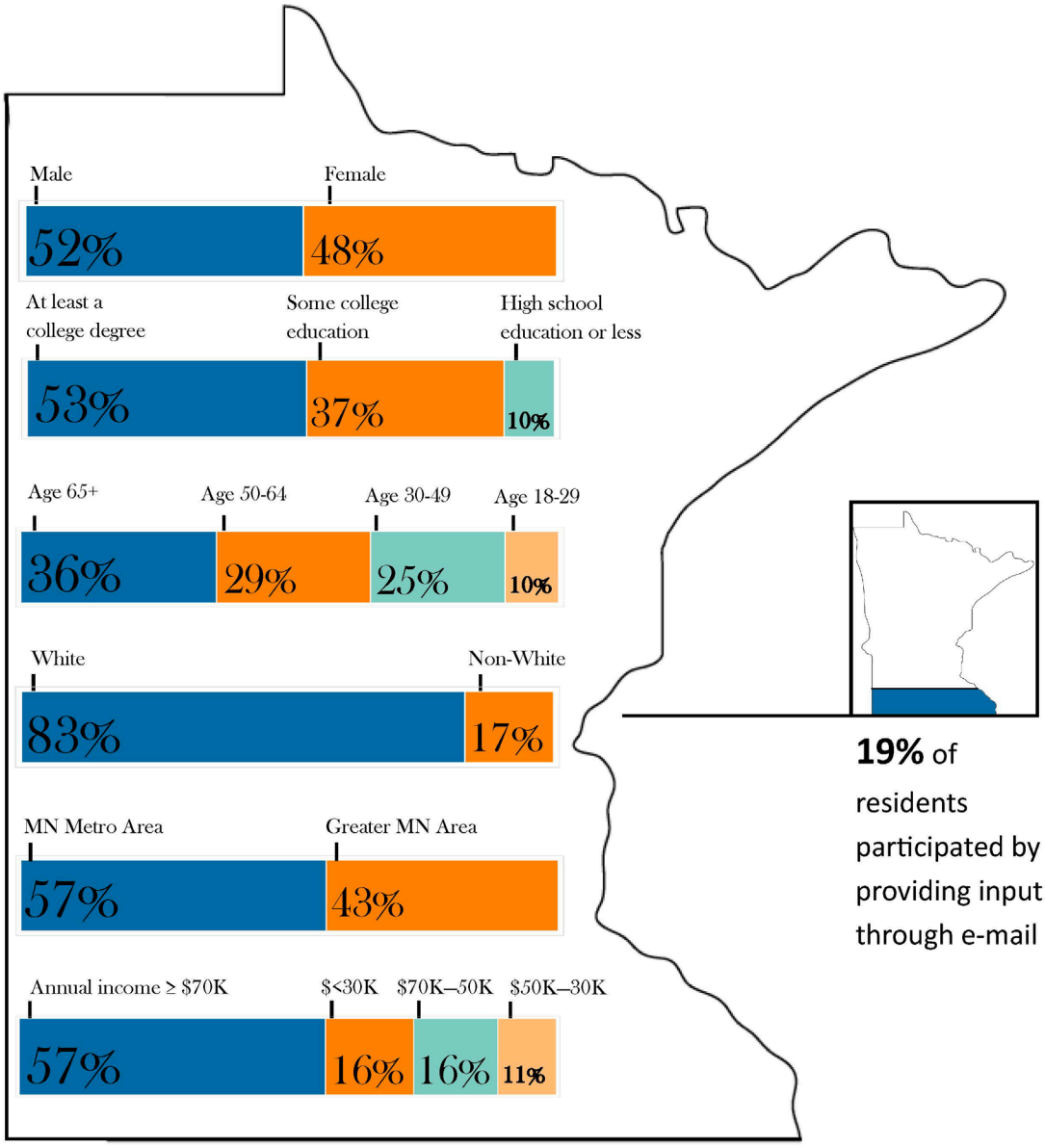
Who participates in transportation planning by contacting a public official?



21% of residents contacted a public official

Results from 820 interviews conducting during Fall 2016 & Spring 2017. Schneider, Peck & Quick, 2017. See http://www.cts.umn.edu/Publications/ResearchReports for full results and report.

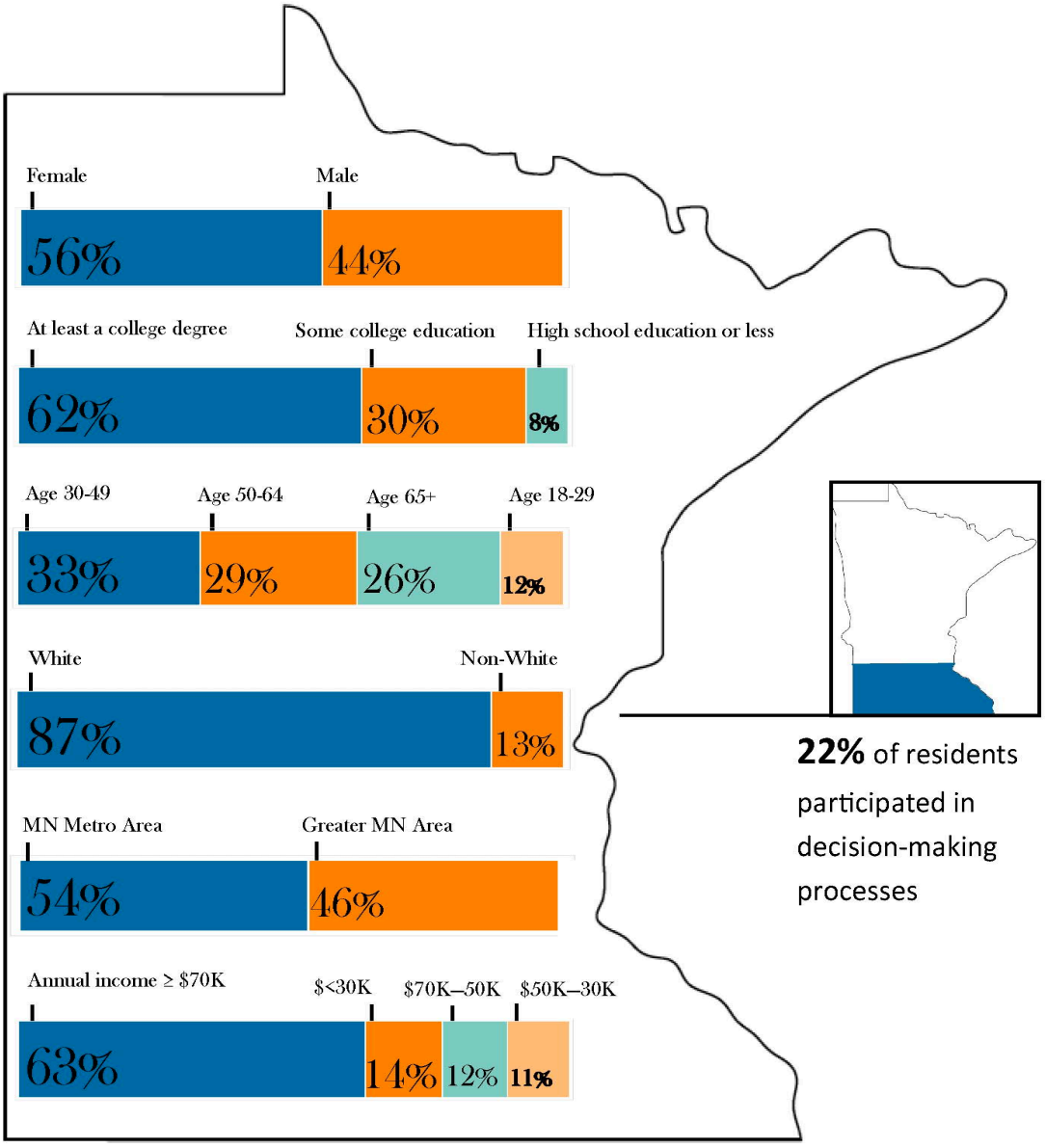
Who participates in transportation planning by providing input through e-mail?



19% of residents participated by providing input through e-mail

Results from 820 interviews conducting during Fall 2016 & Spring 2017. Schneider, Peck & Quick, 2017. See http://www.cts.umn.edu/Publications/ResearchReports for full results and report.

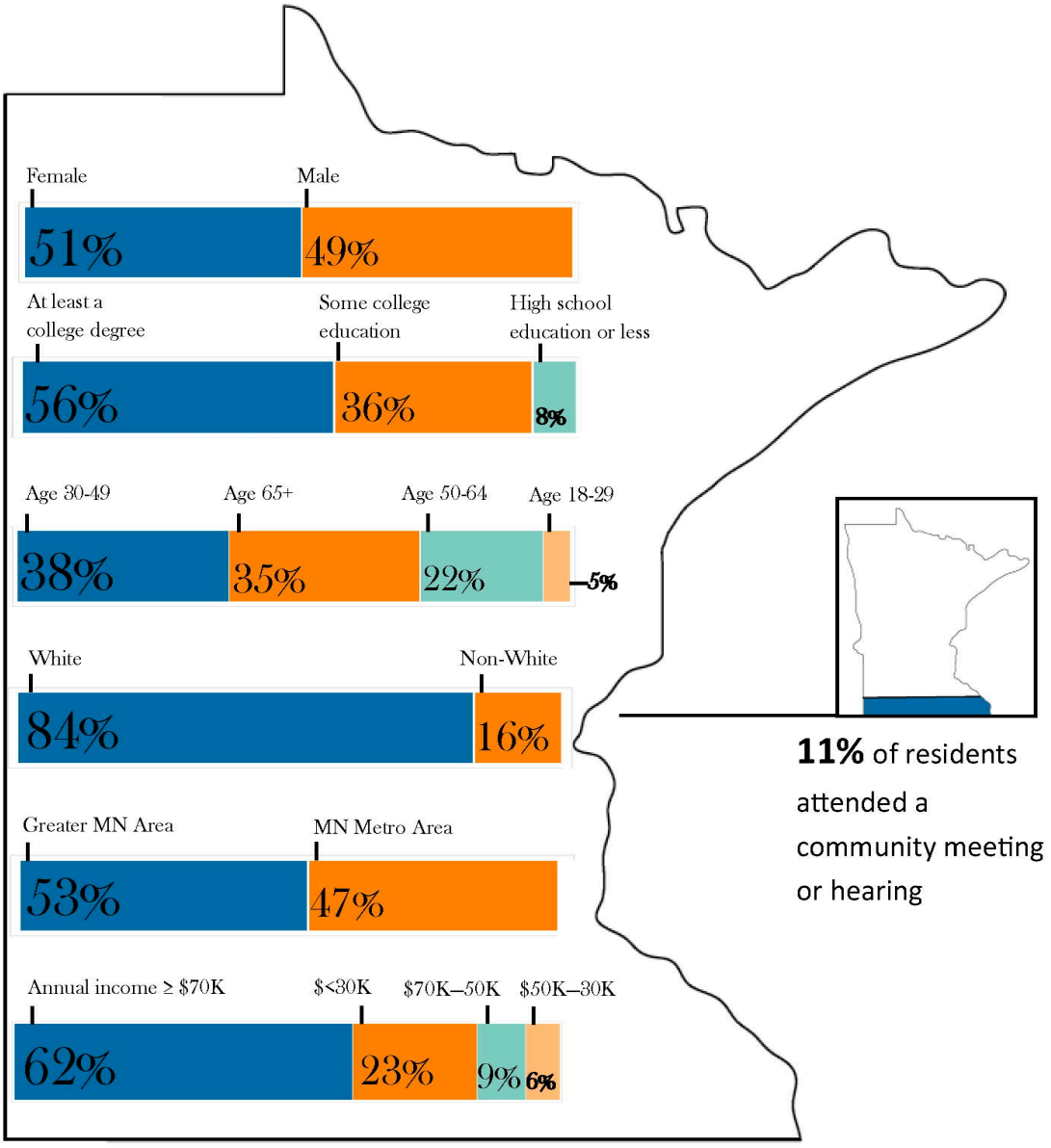
Who participates in public policy or decision-making processes?



22% of residents participated in decision-making processes

Results from 820 interviews conducting during Fall 2016 & Spring 2017. Schneider, Peck & Quick, 2017. See http://www.cts.umn.edu/Publications/ResearchReports for full results and report.

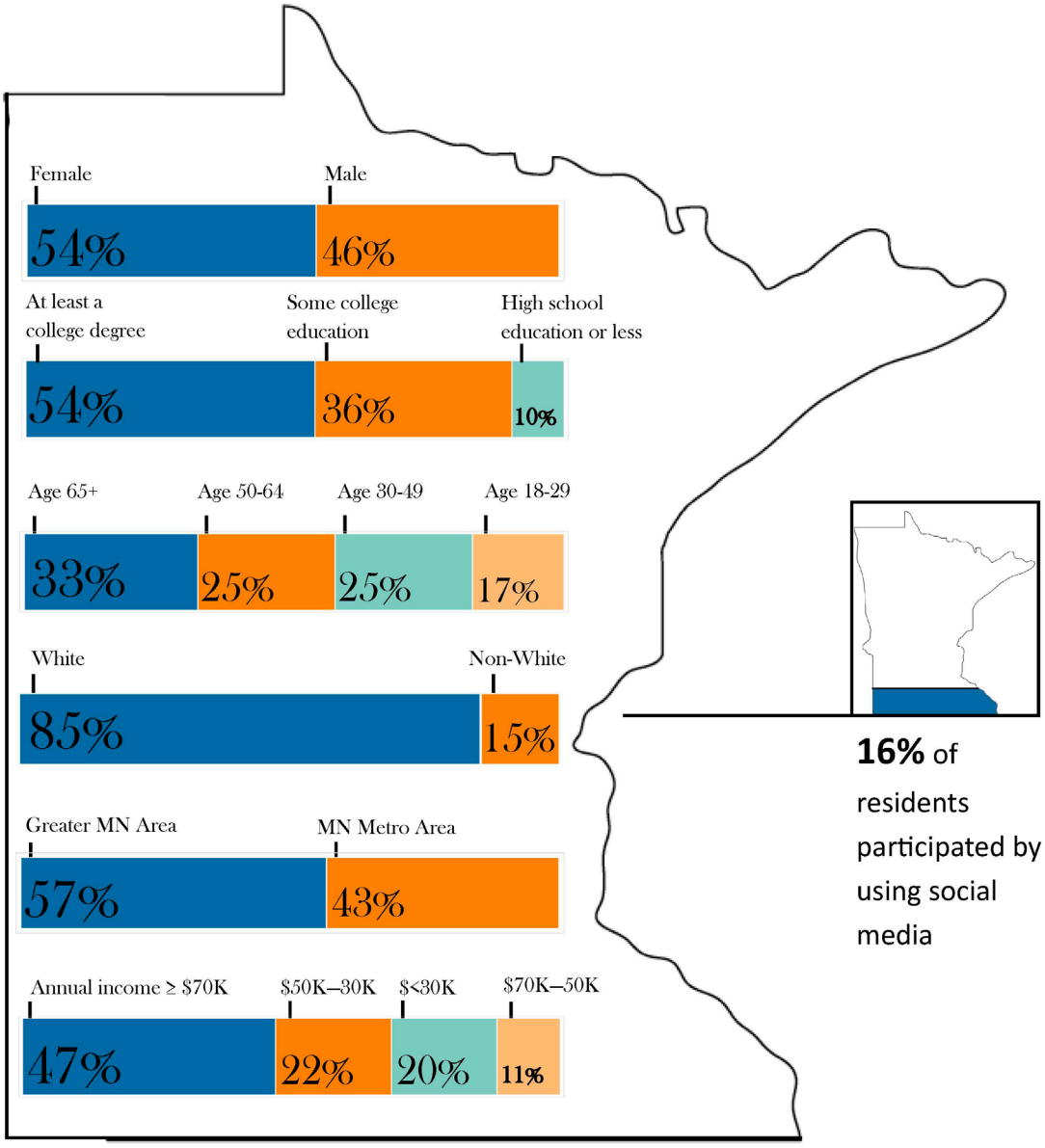
Who participates in transportation planning by attending a community meeting or hearing?



11% of residents attended a community meeting or hearing

Results from 820 interviews conducting during Fall 2016 & Spring 2017. Schneider, Peck & Quick, 2017. See http://www.cts.umn.edu/Publications/ResearchReports for full results and report.

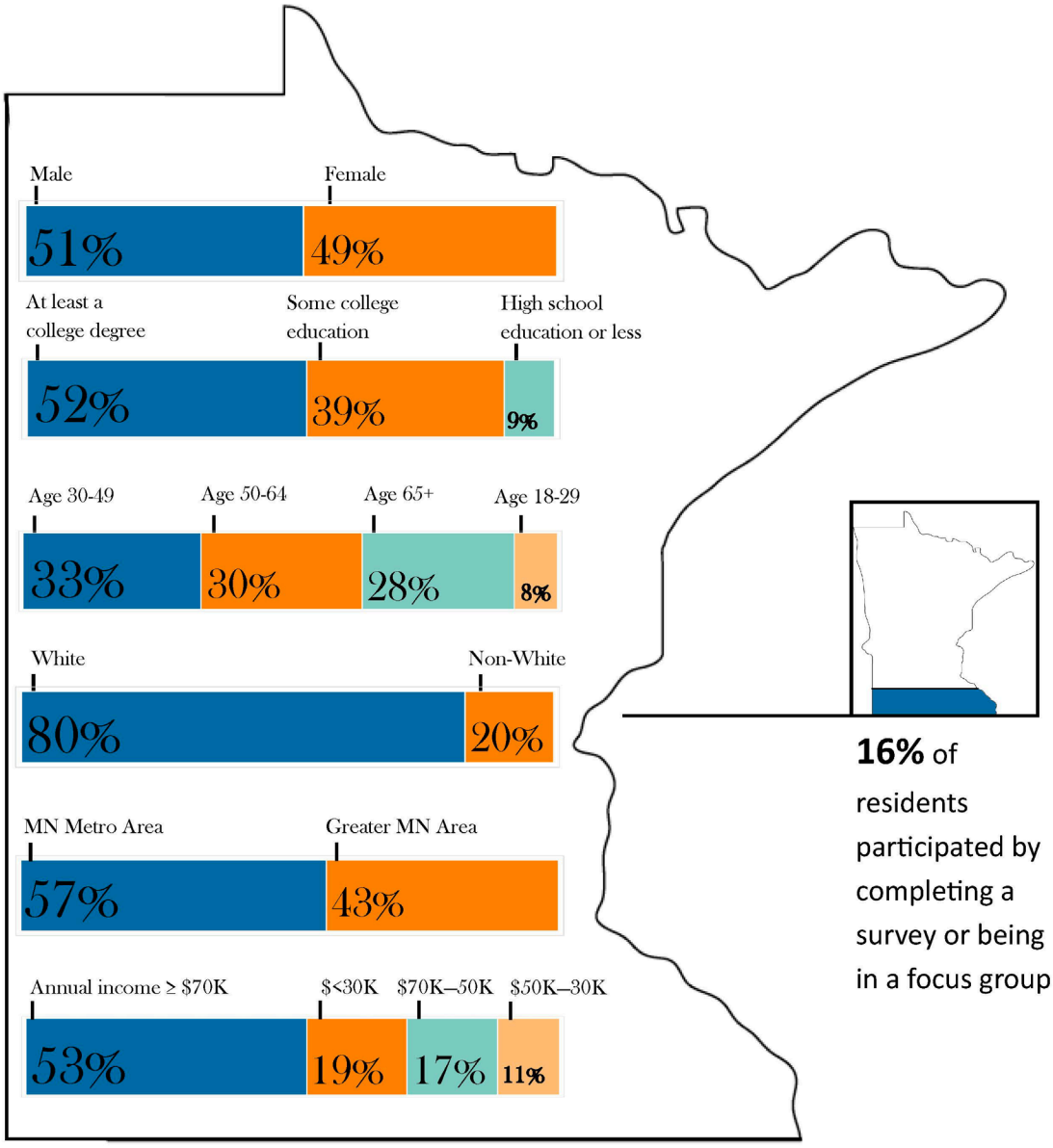
Who participates in transportation planning by using social media?



16% of residents participated by using social media

Results from 820 interviews conducting during Fall 2016 & Spring 2017. Schneider, Peck & Quick, 2017. See http://www.cts.umn.edu/Publications/ResearchReports for full results and report.

Who participates in transportation planning by completing a survey or being in a focus group?



16% of residents participated by completing a survey or being in a focus group

Results from 820 interviews conducting during Fall 2016 & Spring 2017. Schneider, Peck & Quick, 2017. See http://www.cts.umn.edu/Publications/ResearchReports for full results and report.

MINNESOTAN'S USE OF SOCIAL MEDIA

FACEBOOK

Use: 70% of MN daily/every other
Highest use: Women (78%), 18-29 (81%)
Lowest use: Men (60%), 50-64 (65%), $50-69.9K/y (65%)

YOUTUBE

Use: 31% of MN daily/every other
Highest use: 18-29 (64%), non-White (51%)
Lowest use: 50-64 (20%), 65+ (17%)

SNAPCHAT

Use: 15% of MN daily/every other
Highest use: 18-29 (64%), high school grad or less (28%)
Lowest use: 50-64 (3%), 65+ (1%)

INSTAGRAM

Use: 14% of MN daily/every other
Highest use: 18-29 (41%), non-White (25%)
Lowest use: 65+ (5%), 50-64 (8%)

TWITTER

Use: 10% of MN daily/every other
Highest use: $70K+ (13%), non-White (13%)
Lowest use: $50-69.9K (5%), 65+ (4%)

PINTEREST

Use: 7% of MN daily/every other
Highest use: $30-49.9K (13%), female (11%)
Lowest use: $<30K (4%), males (2%)

*Usage rates presented are for Minnesotan's daily/every other day platform use generally, not necessarily to engage with MnDOT or access MnDOT information. Highest and lowest rates presented are across all demographic groups. For highest and lowest of each demographic group, see Appendix C of Schneider, Peck & Quick, 2017.
*Results from 820 telephone interviews conducted Fall 2016 & Spring 2017. Schneider, Peck & Quick, 2017. See http://www.cts.umn.edu/Publications/ResearchReports for full results and report.